VOL. IV. DECEMBER, 1914 No. 12

AMERICAN
JOURNAL OF PUBLIC HEALTH

THE MODERN ASPECT OF THE TUBERCULOSIS PROBLEM IN RURAL COMMUNITIES AND THE DUTY OF THE HEALTH OFFICERS.

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On the 16th of September, upon the invitation of the Commissioner of Health, I delivered an address at Saratoga Springs before the 700 sanitary officers of the State of New York, assembled there for their annual conference. What I have seen, read, and learned from conversations with health officers in rural communities in Canada, Mexico, and Cuba has convinced me that the conditions in the three latter countries, while not exactly the same, still do not differ very materially from those in the United States. It would seem, therefore, that perhaps the publication of the address in the AMERICAN JOURNAL OF PUBLIC HEALTH, a magazine read widely not only in the United States, but also in Canada, Mexico, and Cuba, and particularly by the health officers, might be helpful to the latter in their work of dealing with the tuberculosis problem in smaller communities. I have added some important items which, for want of time, I could not discuss at the time the address was delivered but which I have reason to believe will enhance whatever value this communication may possess.

When I was first asked to speak on the subject of the tuberculosis problem in rural communities, I could not for the moment think that there should be any great difference between the tuberculosis problem in the city or in the town or village. But after some reflection I could well see that there is indeed quite a difference in the method by which tuberculosis must be attacked in the community which on the one hand has not the administrative machinery of a large city, and where on the other, because of the

close personal relations, friendly and neighborly in many instances, the health officer seemingly has not always a free hand to say and do what he thinks is best for the interest of the community at large.

Take, for example, the spitting nuisance. Many a worthy inhabitant of a small village or town, should he be forbidden to expectorate freely where he pleases, when in winter he and his neighbors congregate around the warm stove in the grocery store or post-office and solve the problems of the universe, would consider an anti-spitting regulation an infringement on his inalienable rights as a free citizen. The same would probably hold good if when sitting in summer in front of his own home he should dispose his accumulated pulmonary, bronchial, or salivary secretions or the juices of his chewing tobacco on the sidewalk.

In countries like Cuba and Mexico, on the Plaza, the place where the masses congregate, the spitting nuisance will be equally difficult to combat and it will require a great deal of tact on the part of the health officers of those Spanish-American communities to enforce anti-spitting regulations. It is difficult for those citizens to see how they may not only injure themselves and their families, but the entire community by uncleanly and unsanitary habits.

When, as it happens not infrequently, the careless spitter is upheld by some worthy but retrogressive member of our profession, be it because of political or family antagonism to the present incumbent of the health office, then there surely will be discord and continued spitting. Of course, there are exceptions, but I know that situations such as I have just described do occur and they make the carrying out of sanitary regulations exceedingly difficult in rural communities.

Should there be any community progressive enough to have made tuberculosis a reportable disease, I can readily see that there might occasionally arise unpleasant feeling when the health officer insisted upon reporting such cases. The fear that after being reported a stigma will be fastened upon an individual or family is often an inducement to hide the disease. We all know the danger of the tuberculous individual to a community, small or large, when he behaves as if he were not tuberculous. Even if he should be careful at home because of the advice of a conscientious family physician, he will often be careless when away from home, disseminating his seven billion bacilli per day by the deposit of his sputum where it will have a chance to dry and pulverize and be inhaled as bacilliferous dust by others. He may also propagate his disease through droplet infection. It is very strange how this latter source of infection is sometimes overlooked by otherwise well-trained physicians. The expression "dry cough" is even used by some medical men, yet we all know that small particles of saliva are expelled during the cough, even if the individual does not expectorate.

Whenever the establishment of a provincial or local hospital for the care of tuberculous patients is contemplated, I know from experience what a prejudice the people have against the erection of such an institution in the vicinity of any community, and there is also a prejudice on the part of many tuberculous individuals against entering such an institution. We may put it this way: The most difficult phase of the tuberculosis problem in rural communities is phthisiophobia—the exaggerated fear of the presence of a tuberculous individual. On this fear is based the disinclination of prospective patients to have their chests examined during the onset of early symptoms, such as cough, loss of weight, rise of temperature, hoarseness, sanguineous expectoration, etc. They and their relatives fear being stigmatized in the event tuberculosis is diagnosed and reported. In brief, phthisiophobia is responsible for the disinclination to obey anti-spitting laws, the disinclination of the community at large to have tuberculosis hospitals or sanatoria in the neighborhood, and last but not least, the disinclination of individuals to enter these institutions for treatment and cure.

To some of the younger and less experienced physicians among my readers it might sound strange when I say that the majority of tuberculous individuals think themselves perfectly harmless and are afraid to enter tuberculosis institutions for fear of becoming infected there; and this fear is not infrequently shared by other members of the family. We all know that the successful treatment in the home of the patient, while feasible in some instances, is impossible in many. Yet, upon the early discovery and the prompt treatment of the tuberculous invalid at the right time and in the right place depends in no small degree the solution of the tuberculosis problem.

What can the health officer of a rural community do in the face of the tremendous difficulties which confront him in his honest and sincere effort to be helpful in the combat of tuberculosis? Let me answer this question by picturing my ideal of what such an officer should be.

First of all, the ideal health officer of a rural community must be an ideal man; he must be beloved for his personality, for his tact in dealing with patients, with his fellow physicians, and the other authorities in the community. He must be a thoroughly trained sanitarian. While it would be desirable for him to have a degree of Doctor of Public Health besides the degree of Doctor of Medicine, this to my mind is not absolutely essential; but he must be a thoroughly trained medical man to whom his fellow practitioners can look up and whom they can call on for counsel.

In one of the issues (No. 36, Vol. 29)* of the *Public Health Reports*, published by the United States Public Health Service, in an article entitled "The Making of Health Officers," my good friend, Assistant Surgeon-

*" The Possibility of State Departments of Health Improving the Efficiency of Local Health Officers by Means of Correspondence Courses."

General John W. Trask, in deploring the fact that "there are exceedingly few men with requisite training from among whom the thousands of local health officers can be appointed," recommends a correspondence course in health administration and allied subjects for improving the efficiency of these officers. I most highly approve of this suggestion but would urge that facilities for clinical instruction should be provided in addition, for the ideal health officer should not only be versed in sanitary science in general and be familiar with all the means of preventing endemic and epidemic diseases, but he should also be an expert diagnostician of communicable and contagious diseases, which knowledge cannot be acquired by correspondence.

Besides being all this, he need have not necessarily the gift of oratory, but he should be able to give good practical talks to physicians and to laymen on medical topics, sanitation, and the prevention of diseases. Last but not least, and I may say this with all due respect for the authorities, the health officer of any county must and should be paid a salary high enough to make him independent of practice so as to enable him to devote all his time to his official duties. The position should be for life, as long as he is able to do his duty. It should never depend upon political preferment.

If the community is too small to maintain a well-paid health officer, let us follow the suggestion of Mr. Geo. J. Nelbach, of the Tuberculosis Committee of the New York State Charities Aid Association, and unite a number of the smaller communities under the administration of one health officer, who because of being well paid can be held responsible for the sanitary conditions of the various communities comprising his sanitary district or unit.

And, now, what are the particular duties of this officer concerning the tuberculosis problem? After having united with his fellow practitioners of the community to form an anti-tuberculosis league, after they have pledged themselves to aid him in a conscientious war not against the tuberculous but against tuberculosis, he should give regular popular talks to the town or village folks on the prevention of this disease, of course always under the auspices of the local physicians. The conscientious health officer should prepare himself carefully for such tuberculosis conferences, for it is not so very easy to talk the language of science in the language of the people. Nothing is more difficult than to avoid scientific terms when accustomed to them, and at the same time nothing is more detrimental to the good effect of a popular medical talk than the use of big words and phrases familiar to the medical ear but sounding like Greek, Latin, or Hebrew to the lay mind.

Let the lecturer begin by defining tuberculosis, not as a dangerous contagious disease, but merely as a communicable one, which only becomes

dangerous through ignorance and carelessness. I ascribe the wonderful success of the anti-tuberculosis work in New York City, inaugurated by the distinguished Commissioner of Health of the State of New York and my distinguished teacher, Hermann M. Biggs, to the fact that from the very onset of his propaganda he classified tuberculosis with the communicable and not with the contagious diseases. One must first overcome the fear of the disease in order to combat it successfully. It is a good thing to tell a lay audience that probably every one of them, or at least nine tenths of them, have or have had tuberculosis at one time or another in their lives, and that we are not at all certain that a slight attack of tuberculosis does not confer upon us a certain immunity to future attacks. The lecturer must explain, furthermore, that when we are in good health, thanks to the bactericidal quality of the Schneiderian membrane of our nose, the upward waving sciliæ in the upper respiratory tract, the phagocitic power of the antibodies in our blood, and the bacteria-killing power of the gastric secretions, we have natural factors of defense against tuberculosis. Otherwise, probably every one of us would be ill with the disease. Then let him emphasize in as strong language as it can possibly be put the fact that the honest conscientious consumptive, who takes care to avoid infecting others by his sputum or saliva, is not a danger to his fellowmen and is as safe to associate with as anybody else.

To explain to a lay audience the difference between a contagious and a communicable disease take smallpox as an example. It should be made clear to the hearers that no matter how clean and conscientious a smallpox patient may be, they should not go near him nor touch him unless they have been vaccinated and re-vaccinated and that they should stay away from the smallpox hospital in general. On the other hand, the audience should be told that they may safely touch and shake hands with the conscientious consumptive and even kiss him on the forehead, if they must kiss, and nothing will happen to them. They can also be assured that the well-equipped and well-conducted tuberculosis hospital or sanatorium is the safest place not to catch consumption in.

In popular tuberculosis talks one should never fail to lay emphasis on the value of early diagnosis and impress upon his hearers the fact that an annual or semi-annual examination of their chests by their family physician is one of the safest and, from every point of view, most profitable investments for retaining or gaining health they could possibly make. Since the health officer counsels these people to be examined by their own physicians they will see the altruism in his giving this valuable advice.

In reference to the tuberculosis institution, hospital, or sanatorium, we can also conscientiously say that because of the careful training of the patients and the splendid hygiene in vogue in such institutions no physician, no nurse, no visitor, or healthy inmate ever contracted tuberculosis

there. This also should be told to those who object on sentimental or sanitary grounds to the establishment of tuberculosis institutions in their neighborhood. The mortality from tuberculosis among the inhabitants of villages surrounding sanatoria invariably decreases with the establishment of such institutions. By existing statistics, which are available to all, it can be proven to those who object on account of depreciation of property values, that real estate has improved in the vicinity of institutions for the tuberculous and we will very quickly win over to our side the real estate owner and the real estate dealer.

In talks to the townspeople and farmers, and particularly to the women, the value of fresh air should be taught. They have so much in the country and they make so little use of it; they should be told that the fear of night air is a nightmare, for night air is just as good as day air. In Mexico and Cuba the fear of the night air, particularly at the time of the full moon, amounts in many instances to an almost unconquerable superstition. Here again much patience, education of old and young, and tactful persistent agitation on the part of the health officers will be necessary to overcome the pernicious habit of sleeping with tightly closed windows and doors which is so prevalent in tropical countries. Of course, we all know that this fear of night air in these countries originated in the fear of contracting yellow or malarial fever during the night, and prior to the immortal discoveries of Reed and Lavaran and the works of Gorgas, even physicians looked upon the night air in tropical countries as a propagator of these diseases.

Children and adults should be taught the art of deep breathing; adult audiences should be told all about the necessity for proper food and regular habits and also the danger of intemperance, since alcohol is a strong predisposing factor to tuberculosis.

The habit of cigarette smoking among the adults, male and female, and, alas! also among children, will be even harder to overcome in countries like Mexico and Cuba than in the United States and Canada. Yet that excessive cigarette smoking, particularly because the smoke is inhaled deeply into the lungs, is one of the predisposing factors to diseases of the respiratory tract, particularly of the larynx and the lungs, needs no further argument to be proved. Excessive cigarette smoking lessens the vitality of the individual and makes him more susceptible to the invasion of the germs of tuberculosis, pneumonia, grippe, etc.

In Mexican and Cuban communities the health officer will, I believe, have to have qualifications more than the ordinary mortal possesses in order to be successful in an anti-cigarette crusade among the adults, but he may be able to do a great deal for the children. If he and the teachers will unite to show the impressionable children that cigarette smoking is detrimental to their physical and mental development and that it will

render them susceptible to an early nervous and mental breakdown, they will listen and obey, and thus a vast amount of good can be accomplished and cigarette smoking among children perhaps become unpopular. But let me say in passing that nothing impresses a child so much, teaches him something so thoroughly as example, and unless the health officer and the teacher cease smoking cigarettes themselves, their anti-cigarette talks to children will make very little impression.

The health officer should insist upon the enforcement of anti-spitting laws, should have the people do away with the roller towel at home, in hotels, and in other public or private washrooms. In the United States, Canada, Cuba, and Mexico there are any number of hotels in which the roller towel and the common drinking cup seem to be still permanent fixtures and badly kept spittoons the usual ornament of the lobbies and public assembly rooms.

Outdoor sleeping, which can be carried out so much more easily in smaller communities than in larger ones, should be encouraged. The chiming of bells and the striking of the town clock between the hours of 9 p. m. and 7 a. m. should be stopped as well as other unnecessary and distressing street noises; they are as bad for the nerves of the indoor as the outdoor sleeper and it is as bad for the non-tuberculous as for the tuberculous to be kept awake at night. Except in small villages, I don't see any earthly reason why the rooster nuisance could not also be done away with as has been done in New York City where we recently passed a regulation which will go into effect on November first. This regulation will not permit residents of the City of Greater New York to keep roosters; it will also prohibit persons from raising chickens in their back yards where there is another residence or public institution within seventy-five feet of the poultry enclosure.

The hygiene of rural schools must be improved. In the larger cities we erect the most beautiful buildings for our school children; in some villages and small towns anything from an old barn to the old-fashioned red brick building with low ceiling, with little or no ventilation, and bad lighting, has to do. These schools should be remodeled into open air schools or new ones built in which there should be plenty of open air classrooms. I have said before and I am willing to say it again that in my humble opinion open air schools, at least for primary grades, must become the rule and indoor classes the exception if we wish to prevent and combat tuberculosis in childhood.

In warm countries, particularly in the villages, open air schools should predominate and a good part of the time the smaller children could be taught entirely in the open air.

Health officers should even concern themselves with the hygiene of the churches. Places of worship should be properly ventilated and frequently

cleaned. In Protestant churches the use of individual communion cups should be advocated and in Catholic churches careful attention should be paid to the frequent disinfection of crosses and other articles of adoration, often kissed by the devout.

Anti-tuberculosis talks should be given to priests, ministers and teachers or directly to the children; and popular medical literature distributed in schools for the children to take home, will make fresh air apostles of these little ones and reach the old folks at home, thus combating the tendency to tuberculosis in the adults and in the young.

The laws against bovine tuberculosis should be enforced, for we must bear in mind that ten per cent. of the tuberculosis in childhood is due to the bovine type of the disease. All milk except such as comes from cows periodically tested with tuberculin should be sterilized. No individual with an open pulmonary tuberculosis (when the disease is active and bacilli are found in the sputum) should be employed in a dairy or in the handling of milk in stores.

All suspected sputum sent to the health officer must be carefully examined, but the physicians sending these specimens should be told that often several specimens are necessary in order to find the tuberculosis germ; and it cannot be repeated too often that, while the presence of tubercle bacilli in the pulmonary secretion of the individual is absolute proof of the existence of the disease, the absence of the germ does by no means prove that there is no tuberculosis. In the earlier stages of the pulmonary type of tuberculosis, because of little disintegration of pulmonary tissue, the germs of the disease are found but rarely, and yet it is in this early stage that we can most hope for complete recovery. It is therefore of vast importance that every community should have physicians who are experts in the physical diagnosis of the disease in its earliest stages, and the health officer of a community should be particularly qualified to aid his fellow physicians in the early discovery of tuberculosis.

Health officers should see to it that every patient with open tuberculosis receives hospital and sanatorium care, or at least gets his sanatorium treatment under intelligent guidance at home. There should be no uncared for tuberculous individual in any community which has an efficient health officer and an intelligent municipal or county government. The sanatorium should be made a center of education for physicians and laymen, and hospitals for advanced cases should be made attractive, so that those who ought to enter will enter willingly and gladly because they will receive better treatment there than they could at home. If the institution has cheerful and attractive features they will miss the home less.

The consumptive is the ideal victim of the quack, charletan, and vendor of patent medicines, and this is particularly true of the consumptives who live in rural communities where often the local papers derive their greatest

income from advertising nostrums and sure cures for consumption and other diseases. There should be a health publicity column in the local paper to enlighten the public. If necessary, the provincial or local department of health should pay for this to compensate the poor editor for his loss of quack advertisements. The laity should be told that there is no sure cure for consumption; that good air, rest, and good food under careful medical supervision, and the scientific administration of medicine to relieve distressing symptoms are, up to this date, our only means of curing tuberculosis, and that every advertisement of a sure consumption cure cloaks a swindle.

In all talks to laymen the health officer should try to imbue them with his own enthusiasm and devotion to the tuberculosis cause. He should tell his hearers that tuberculosis is not merely a medical disease but that it has a very large social aspect. Bad housing, overcrowding, dangerous congestion, and even underfeeding exist alas! not only in our large cities, but also in smaller communities. Wealthy and influential citizens should be shown what great good they can accomplish by becoming interested in the amelioration of such conditions as are conducive to the spread of tuberculosis. They will themselves benefit in the end from a clean and healthy community. Personal service to the consumptive poor, and kind, generous, and considerate actions toward those afflicted with tuberculosis, rich and poor alike, will create a better and more helpful feeling throughout the community.

It is essential, in order to prevent and cure the disease, that the laymen and physicians of the community, whether large or small, should forget their little social, political, or religious differences and work hand in hand for the common good.

From what has been said it will be seen what a great task the health officer of a small community has before him if he wishes to combat tuberculosis successfully. It would certainly seem easier in the larger cities, but there is one advantage the health officer of a small community has over his colleague in the city, and that is the knowledge of existing conditions by personal observation. If he will but have it for his maxim to make earnest and conscientious war against tuberculosis but no war against the tuberculous invalid; if he has the greatest consideration for the welfare of the latter and thus for the welfare of the community at large, the health officer is bound to succeed; he will ingratiate himself with his fellow practitioners and the community at large which he serves.

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INVESTIGATION OF HOOKWORM INFECTION AT THE PING HSIANG COLLIERY, CENTRAL CHINA.

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Several factors have contributed to the belief that an investigation of hookworm infection and the conditions favorable to it in the Ping Hsiang Colliery would yield results of both economic and scientific importance. Among these factors is the paucity of definite and localized studies of the incidence of this disease in central and southern China, together with the well-established fact that the hookworm does occur in these regions. The numerous mines of South Hunan, Kiangsi and the adjacent territory of Kwangtung seemed to offer abundant foci of infection and a possible explanation for the scattered incidence of the disease in these provinces. If any widespread systematic effort is to be made to eradicate ancylostomum in China, the mines, particularly the deeper ones, must receive first attention, according to the analogy of conditions prevailing in other countries.

It is not the purpose of this report to enter on the economic, social or physical significance of hookworm infection. These factors are reasonably as powerful in China as in other countries where further sanitary progress has been made. The abundant literature also cannot be reviewed at this time, nor the history of the disease and of our knowledge of it. For these features, reference is made particularly to the writings of Loos in Egypt, Ashford and King in Porto Rico, and Stiles and his associates in the United States Public Health Service. Within the last four years the situation has been fully reviewed by the Rockefeller Sanitary Commission for the Eradication of Hookworm. The work of the Rockefeller Commission is monumental and the three annual reports so far presented have shown that the disease can be eradicated, as is being done in the United States. The Commission finds that hookworm infection belts the earth in a zone 66 degrees wide extending from 30 degrees south latitude to 36 degrees north latitude. Not one country in this zone is exempt. To summarize, it was felt that investigation of the prevalence and conditions favoring ancylostomiasis in the deep mines of south-central China would be of value because of the known occurrence of the disease in this section, because of the importance of mines in its propagation and spread, and because future efforts to eradicate so serious a disease must be based on definite knowledge of its incidence and strongholds.

With these considerations in mind and desiring to institute studies well within the affected zone, negotiations were opened in January, 1914, between

the Changsha Yale Hospital, located in the capital of Hunan, and Mr. G. Leinung, chief of the staff of German engineers who operate the Ping Hsiang Colliery. The result was a hearty coöperation of the German staff with the Yale Hospital, and a member of the hospital staff was detailed for this investigation which occupied the three weeks from March 25 to April 16, 1914. Many reasons favored the selection of the Ping Hsiang Colliery for this initial investigation. It is the largest colliery in China. Its underground workings are very extensive. The German staff gave every facility and opportunity for the work.

The Ping Hsiang Colliery.

The Ping Hsiang Colliery was started some twenty years ago by Mr. G. Leinung representing the German engineers, and Mr. Chang, representing the Chinese company, on the site of native coal diggings which had existed for an indefinite period before. In two decades the institution has grown to its present size with a daily production of 2,400 tons of bituminous coal. Extensions now being built will raise the output to 3,500 tons within the next six months. Approximately 9,000 persons are on the pay-roll, of whom about 6,900 work underground. The colliery is a branch of the Han Yeh Ping Company, a Chinese organization having its headquarters in Shanghai. This company operates an iron and steel plant at Hanyang across the Han River from Hankow which is supplied with iron from a mining branch at Tai Yeh and with coke from the Ping Hsiang Colliery. The coal above the amount converted into coke is distributed through Hunan and Hupeh.

Geography.

The colliery occupies a charming situation in the valley running east from the large walled city of Ping Hsiang in the western edge of Kiangsi Province. It is located at the village of An Yuen five miles from Ping Hsiang. In spite of the 900 miles distance inland from Shanghai, following the course of navigation on the Yang tza and Siang Rivers, the altitude of An Yuen is surprisingly low. The main adit and main level of the mine is just 500 feet above Shanghai sea-level. The range in which the coal-beds lie varies in height from one to two thousand feet above sea-level. This comparatively low altitude is a factor to be remembered in considering the incidence of ancylostomum.

An Yuen lies on the watershed between the Siangtung River running west into the Siang River in Hunan, and the Siu River running east into the Kan which empties into the Poyang Lake in Kiangsi. Southeast of the village is the range of the Lo Siao mountains in which are the coal fields. This valley, like all the multitude of valleys intersecting it, is solidly terraced with paddy fields, and the paddy field offers a peculiar and

difficult problem when it is infected with hookworm. The colliery is in longitude 114 degrees east and latitude 27 degrees and 30 minutes north. It is located in one of the richest mineral districts in China, namely, the section south of the mid-Yang-tze, including Kiangsi, south Hunan, and the adjacent portion of Kwangtung. In this district are almost limitless coal fields which have been scarcely scratched by the centuries of native mining in those situations where the strata pinch out at the surface. In conjunction with the coal are vast iron deposits, and also limestone, antimony in places, manganese and silver. Natural gas and oil have not been found but thus far no deep borings have been made in this section.

At present the only approach commercially to the Ping Hsiang Colliery is by steamer from Hankow to Changsha or Chuchow in Hunan and thence by railroad sixty miles at the shortest to An Yuen. A British concession, however, has just been granted for a railroad from Ningpo to Changsha by way of Ping Hsiang with a branch midway to Hankow. Such a line will open this great mineral district to aggressive development. Commercial development of the mineral resources, not to mention the social and economic welfare of the inhabitants, will suffer severe damage if practical measures are not taken from the first to combat hookworm infection in this locality. The well-known menace of this disease in mining and industrial regions elsewhere in these latitudes, the extreme difficulty of eradicating it from deep mines, especially where the climate is such as here, and finally the fact to be developed in this report of the high rate of incidence of an ancylostomiasis in the Ping Hsiang Colliery together with its presence to a lesser degree throughout this section, these things together make the question of hookworm infection of central China mines is a problem of the most pressing hygienic and economic concern.

Meteorology.

Accurate meteorological measurements for the entire year at the Ping Hsiang Colliery are not yet available but for February, March and April, 1914, the period immediately preceding and including this investigation, careful records were kept. The average annual rainfall is about 750 mm., the maximum amount falling between February and June. From September to December there is practically no rain. The table of average thermometric and barometric measurements on the next page is compiled from the figures of Mr. Esterer of the Colliery Engineering Staff.

It thus appears that in spite of the fairly low average temperature for the three months of 12.7 degrees, the humidity is very high, a factor of no inconsiderable importance in the propagation of hookworm and other parasitic affections. During these months rather high maximum figures occurred, which again favors parasitic development. The minimal temperatures, which contribute largely to the low average temperature, were

not long sustained and their temporary nature would have small inhibiting effect on parasitic organisms. As February and March are the first two months of the rainy season, high humidity is to be expected but while this helps to explain the atmospheric moisture, it does not diminish its effect on the development of the hookworm and other parasites. For the period included in these observations, the amount of sunlight was about 35 per cent. of the maximum possible if every day had been clear. This was a factor in preventing higher temperatures as well probably as in raising the humidity.

		Thermometer.				Barometer.			
		Dry scale.		Wet scale.		Per cent. relative degree of humidity.		Mm.	
		A. M.	P. M.	A. M.	P. M.	A. M.	P. M.	A. M.	P. M.
February	Max.	15.0	21.2	14.0	19.5	93.5	90.0	769.0	759.4
	Min.	4.3	4.9	3.6	4.1	68.5	54.9	748.0	752.4
	Av.	8.1	10.9	7.7	9.1	85.8	78.3	757.2	756.3
March	Max.	21.8	29.0	17.5	21.5	95.5	95.3	764.0	762.5
	Min.	4.0	4.0	3.5	3.3	65.3	41.6	741.0	735.3
	Av.	11.4	15.0	10.7	9.0	86.6	75.1	754.3	750.0
April	Max.	25.6	27.0	20.0	23.0	91.0	90.2	763.2	761.2
	Min.	4.2	4.6	3.5	4.0	57.0	54.5	748.1	745.0
	Av.	13.8	17.1	11.8	13.5	79.7	73.2	755.6	755.3
General Average		12.7		10.3		79.7		754.7	

Note: All temperatures are on centigrade scale.

Water Supply.

The distribution of the water supply of the colliery may be divided among the following heads: 1. Water used in technical processes in the coal-washing plants, which is used over and over again and requires an hourly addition of 5 cubic metres of fresh water. 2. Water used in the coolie bath and boarding houses, amounting to 8 cubic metres per hour. 3. Water used to quench the red-hot coke as it is removed from the ovens, amounting to 5 cubic metres per hour. 4. Feed water for the boilers of the power plant amounting to 16 cubic metres per hour. 5. Water used in the European house for domestic purposes, amounting to .8 cubic metres per hour, giving a total of 34.8 cubic metres of water used hourly above ground by the colliery.

Strange as it may seem, the mountains surrounding An Yuen do not afford available springs or streams from which this large amount of water

may be drawn. The surface waters are used for the paddy fields and no provision exists for gathering and storing rain water. The entire water supply is therefore taken from the mine. As described elsewhere, the further and higher levels of the mine drain off the water which accumulates in the comparatively shallow native mines on both sides of the range. Practically all of the mine water is from this source, as it is only in the general localities where coal-seams outcrop that the levels and drifts of the deep mine approach the surface, and it is also in these localities that all the native mines are sunk. Hence the surface waters very largely drain into the native mines and not directly into the drifts of the larger colliery. The geologic arrangement of the strata of the coal-bearing range likewise tends to make the native mines an intermediary agent in collecting surface waters and draining them into the colliery. The native mines pierce the superficial clay strata which parallel the surface and so lead the water to the out-cropping coal seams immediately beneath. Thus practically all the water in the colliery is derived from that collected by the native mines.

Sanitary conditions are not found in the native mines. The temperatures range very high in them, averaging from 30 to 35 degrees centigrade, due to the small calibre of the shafts, the single bore, the entire lack of ventilation, and the large number of people working in them. Practically every one of the 200 and more native mines in South Hunan and Kiangsi, which furnish the basis for these statements, had at some part a water depth of from 6 to 18 inches through which every coolie must walk every time he entered the mine. Very frequently the calibre of the drift is so small as to necessitate crawling and sliding with a liberal application of dirt and mud to hands, face and neck. The entrance shafts are not vertical but inclined at an angle of from 20 to 40 degrees following the inclination of the coal seam. To allow passage through them a narrow wooden or bamboo ladder is fastened on the earth of the floor of the incline. The rungs of these ladders are characteristically Chinese in their close placement, each step being only from 6 to 10 inches. The ladder is fastened snug against the wet clay floor of the shaft and the coolie tramps heavily up and down at each step pressing his foot firmly into the warm mud under the ladder rung, and dragging after him a basket filled with earth or coal, which slides along the upright side pieces of the ladder. These features of the native mines and their relation to the Ping Hsiang Colliery are discussed in detail for two reasons. First, is their important and intimate bearing on the question of water supply and hookworm infection of the colliery. Second, is the very grave question of the degree of incidence of the hookworm in the native mines and the very serious problem of its eradication there. It will not be possible to eliminate hookworm infection from central and southern China so long as such ideal culture beds as these native mines are left as constant and productive foci of infection.

There is every reason to believe that in the native mines the incidence of ancylostomiasis is very heavy. The close relation by drainage between these mines and the large colliery, and the fact that practically all the water in the colliery is from this source, suggests the probability of a constant fresh infection of the colliery from the native mines as well as a constant pollution of the mine water of the colliery from fecal and urinary contamination in the native mines. Further investigation of this point would be a reasonable procedure.

The water of the colliery is not only subject to chemical, bacterial and entozoal contamination at its source, but it suffers most serious pollution in the colliery itself. At least 2,500 coolies are constantly at work underground, and their urine and feces are indiscriminately and quite thoroughly spread through the mine. Especially in the upper and wetter levels is this of the utmost importance because the water and soft mud on the floors of many drifts are being constantly churned by the bare feet of hundreds passing. The fecal material is thus intimately mixed with the thin mud and widely distributed even outside the mine by the mud adhering to the coolies' feet and clothing. In view of the darkness and high temperatures, a more ideal arrangement for the propagation and dissemination of the hookworm and similar affections could scarcely be conceived.

The chemical condition of the mine water is shown in the table on the following page giving a complete chemical analysis of the waters from the main adit, and from the shaft, compared with the figures for an average normal drinking water.

As would be expected the total hardness of the water is high—between two and three times the average normal. It is to be noted that the magnesia fraction of this total hardness is especially high and clinical experience bears out the theoretical conclusion that, used for drinking purposes, this water predisposes to diarrheal conditions especially in new-comers. In the tropic heat of summer this might well increase the danger from dysentery and typhoid germs, pathogenic amœbæ and other intestinal parasites. The high proportion of chlorine and the presence of nitrates and traces of ammonia clearly indicate urinary and other organic contamination. These substances naturally are not dangerous in themselves but their presence strengthens the probability of accompanying dangerous chemical and biologic bodies.

Referring again to the uses to which the mine water is applied it is evident that in its employment in technical processes the only sanitary danger is incidental. The chance for infection with hookworm lies chiefly in the accumulation of more or less wet coal-dust and mud on the floors on which the bare-foot coolies are at work and in the hand labor of picking extraneous matter from the coal as it passes along an inclined chute. In the use of the water in the coolie bath and boarding houses and in the hos-

pital a much more serious situation appears. The bath and boarding houses are described in a later paragraph. The infected and dirty water from the mine is in part heated before being sent into the bath-houses, so that it is improbable that many hookworm larvæ are brought in by the water supply, but all unheated water may with reason be subject to suspicion.

The same holds true for the use of mine water for bathing purposes in the hospital and also for its use for domestic purposes in the houses of the foreigners. It is improbable that the affection spreads to any extent through drinking water. The Chinese drink almost no water and in the preparation of the omnipresent tea the water is boiled, a fact that without question has made no small contribution to the longevity of the race. The foreign staff, too, uses drinking water with the utmost moderation and while this is not universally boiled as it should be, the meagre quantities used minimizes the dangers of hookworm infection. The fact that of the foreigners examined, only those were infected whose work took them

WATER ANALYSIS BY MR. ESTERER.

Calculated as grams per litre.

Item.	Shaft water.	Main adit water.	Pure drinking water.
Total residue	0.8361	0.5442	
Residue after boiling	0.6703	0.4345	
Suspended matter	0.0503	0.4122	0.
a. Organic	0.0123	0.1941	
b. Inorganic	0.0380	0.2181	
Silicic acid	0.0160	0.0160	
FeO and Al_2O_3	0.0038	0.0028	
So_3	0.5429	0.1475	0.0600
Chalk (CaO)	0.2160	0.2476 } See hardness	
Magnesia	0.1501	0.0993 }	
N_2O_3	0.0003	0.0001	0.0000
N_2O_5	0.0006	0.0005	0.0200
Ammonia	0.0000	Trace	0.0000
Chloride	0.0148	0.0174	0.0010
Permanganate-binding	0.0136	0.0089	0.0600 to 0.0100
Permanent hardness	19.2 degrees	8.2 degrees	
Temporary hardness	14.7 degrees	22.4 degrees	
Total hardness	33.9 degrees	30.6 degrees	8 to 12 degrees
Reaction	Neutral	Neutral	
Odor	Stale	Stale	
Appearance of filtered water	Slightly yellow	White-clear	

constantly into the mine, tends to show likewise that drinking water infection is uncommon to say the least. However the possibility of such infection is certainly present as well as that of typhoid, dysentery and other diseases. A new water system is now being installed which will secure water from a purer source and store it in a screened and locked reservoir from which it will be piped to each house. All of the water for drinking and bathing alike for foreigners and Chinese will pass through coke filters and will undergo a softening process which will in large degree eliminate the dangers of the present water supply.

General Lay-Out of the Mine.

As has been stated, entrance to the mine is twofold—by way of the main adit going straight and horizontally into the mountain from the floor of the valley, and by way of two shafts, 300 and 500 feet in depth respectively. The shaft division is the part originally worked and is smaller in extent and output than the section tributary to the main adit. It includes only the deeper parts of the coal seams below the level of the valley and the main adit. The bulk of the mine, reached through the main adit, is above the level of the valley floor, and comprises four levels above the main level, each with its numerous lateral drifts following in each seam. The fourth level is near the summit of the range and egress could easily be obtained from it at many points.

The main adit is 2,500 metres in length and is traversed by a double and in some parts a sextuple tracked electric tramway, which incidentally is the oldest electric railway in China. The coal seams are in three groups which are successively pierced at right angles by the main adit. These groups are parallel and are inclined at an angle of 20 degrees to the main adit. Where the adit pierces the nearest and thickest group of seams, is the junction with the main level of the mine which runs in the seam transversely to the adit, with lateral drifts following the seam up and down according to its inclination. This main level is 2,000 metres from the entrance to the mine. Five hundred feet further is the third group which has been worked out.

The seams are thus all transverse to the main adit and inclined upward and away from it at a 20 degree angle. Lateral inclined drifts from the main level and its branches in each seam follow upward in each seam for about 120 metres where it reaches the first level, which runs horizontally in the seam parallel to the main level and in turn has lateral inclined drifts following upward in the seams to the second level. So the plan continues to the fourth and highest level. The average absolute difference in altitude between adjacent levels is about thirty metres.

As practically all the work is done by man labor, these numerous steeply inclined drifts through which materials must be carried assume considera-

ble importance from the abundant moisture, the omnipresent dust and mud and the fact that hands, arms and even head and neck are of necessity brought in contact more or less with the mud and water. This is true for the foreigners, too, and opens a possibility for hookworm infection through the skin of hands, neck and face, even when the feet are well shod.

Below the level of the adit and main level are two deep levels communicating with the main level, but with haulage ways tributary to the main shaft. The mine ventilation is surprisingly good so far as oxygen supply is concerned, there being few points where lamps do not burn freely. The ventilating system depends on the liberation of compressed air which is piped throughout the main drifts, and on the maintenance of a powerful suction of air into large furnaces in two widely separated parts of the mine, whose flues lead to the surface. The ventilation is controlled by the usual system of air-compartments and doors. In spite of the frequent difficulty with mine fires, coal-dust and mine-gas, the system is effective. To it is due the fact that the average temperatures of the mine are not higher. In the lower levels the temperature averages between 23 and 24 degrees centigrade. As the altitude of the levels increases, the temperature rises to some extent until in the upper levels it ranges from 27 to 29 degrees centigrade. For reasons already presented the higher levels are also the hotter ones. Thus moisture and temperature increase together, a condition which would be expected to determine a higher degree of hookworm infection in the upper levels of the mine. As a matter of fact such an increased incidence was not found, but the infection was apparently distributed with considerable uniformity throughout the underground works. This is easily explicable in the light of the following facts. The long period in which the mine has been operated and the frequent shifting of coolies from one part to another, would tend to equalize the incidence. Then too the natural and very rapid drainage from the higher to the lower levels, from which the water is pumped out, unquestionably has an important rôle in carrying the infection from the higher and more favorable levels to the lower sections.

Above ground is an extensive plant also, which includes several units. The coal from the mine goes directly to the two washing plants where it is cleaned, sorted and graded, and where all of the dust is separated for the preparation of coke. The important sanitary features in these buildings from the present standpoint are the imperfect lighting, the apparent necessity for hand-picking of the wet coal and the accumulation of dirt and moisture from the coal as it goes through the building. That these points are not without significance is shown by the fact that a considerable degree of hookworm infection was found here, the incidence being about two-thirds that in the mine. A contributing factor is however found in the occasional interchange of coolies between the mine and the washing plants,

and in the fact that the coolies from the washing plants live in the boarding houses and use the baths of the mine coolies.

Next to the washing plants are the coke ovens and here the only factors favoring dissemination of the infection are the custom of the coolies of using their feet in pushing the wet coal dust from the tram cars down into the ovens, and the fact that in quenching the glowing coke after burning, the coolies stand bare-footed or lightly sandalled in the water as it runs back into the drains. This latter condition is insignificant and the former is easily susceptible to remedy.

The machine shops, foundry, carpenter and pattern shops, smithy, car construction house, and steel-working shop are of considerable size and offer certain facilities for the spread of ancylostomiasis. Chief of these may be mentioned the dirt which adheres to pieces of machinery such as pumps, engines and gearing brought from the mine for repair. This dirt is a potent source of hookworm infection in the shop employees who handle these largely by hand and without any preliminary washing or cleaning. This is the chief etiological factor undoubtedly in the moderately high incidence found in this class of workmen. None of these men live in the company boarding houses. Few if any of them have previously worked in the mine. The shops are across the railroad tracks from the washeries and other colliery buildings, and there is little intercourse between the two sets of employees. Then, too, the proportion of a better class of workmen is higher as the work is more technical, demands greater skill, and is accordingly better paid. The result is a higher scale of dressing with shoes more constantly worn, and a minimum of strictly coolie labor. Viewed with consideration of these circumstances, the infection rate is surprisingly high, and apparently indicates a more general distribution of the hookworm outside of the mine proper, and even of the colliery.

The nature of the work, the conditions under which it is done, and the better character of employees necessary to perform it, decrease greatly the degree of infection in the power and compression plants, the offices, magazine and hospital. In these units the disease occurs chiefly in those whose work takes them at times into the mine. The living conditions of the foreign staff are admirable alike from a sanitary as from an æsthetic standpoint. Their dwellings are placed well up on the mountain side with no cultivated land above or back of them, and with free drainage from the steep slope. The installation of the new filtered water system will even increase the present excellent health conditions and still further reduce the danger from water-borne diseases.

The coolies from the mine and above-ground units exclusive of the shops, live in large boarding houses which are owned and operated by the company. The average expense to the company per man daily for board and lodging is 8 cents Mex. This, as also the oil for lights in the mine, amount-

ing to 4½ cents per 12-hour shift for each man, is furnished by the company in addition to the wages paid. The wages vary from 30 to 40 cents Mex. per day with the nature of the work. There are three large and eight small boarding houses. The large ones are two-story brick structures divided on each floor into large rooms each with a pair of windows at the outer end and the hall door at the opposite end. The sides are lined with tiers of very wide and spacious bunks, 24 in all and each room accommodates 48 men, of whom half work on night shift and half on day shift. Between the bunks is space for tables, chests and stools. From each room one man is detailed to bring from the kitchen the food for the entire group of 24 men, which is eaten in this room. The latrines and baths are in separate buildings.

The conditions in the boarding houses are far from ideal especially in regard to light and air, although on the other hand they are a vast improvement over the conditions under which the coolies would live outside. From a sanitary standpoint, lighting and ventilation are inadequate, the brick floors and walls wear badly, and the general brick construction is unsatisfactory. But the bunk-rooms and boarding houses present no features of special importance for the propagation of the hookworm.

Outside of the large bunk-houses are small brick structures used as latrines. The Oriental habit of the people precludes the use of any western toilet seat, as even when it is provided, the coolie merely squats on top as he has done for ages immemorial and the seat receives more or less of the material intended for the receptacle beneath. The most feasible form of latrine is the one here provided. The floor space of the building is occupied by a brick-walled pit about seven feet in depth, across which are laid heavy planks a foot in width with an interval of some ten inches between. This arrangement reduces to a minimum the soiling of the coolies' feet and clothing with fecal matter, and the level of the planks is above the range of splashing. On the side opposite the entrance, the pit extends perhaps a yard beyond the wall of the building, and to this place come the farmers with their buckets and carry away the material for the fields.

While the arrangement of these latrines is admirable so far as it concerns the danger of spreading hookworm infection among the mine coolies, there is another equally important feature which is not so fortunate. The mixture of feces and urine does not remain long in the latrine but is quickly carried away to the paddy and vegetable fields in the valley. The common pit affords an excellent means of thoroughly mixing the feces from highly infected cases with that from the non-infected, and the result is a uniformly heavy infection of the material which is carried away by the farmers. Thus there is a constant and large stream of hookworm infection from the mine distributed broadcast through the agricultural sections. Not only are measures in order to free the colliery from hookworm im-

portant but it is of the utmost sanitary importance that no source of infection be left open from the mine to the outside country.

Two bath-houses are provided in each of which several hundred men can bathe at once. Especially at the hours when the shifts change these houses are crowded. Their size and ventilation are fair but increased window space is needed. The flooring is of brick with the usual disadvantages of irregular wear and permeability. Across the full width of the floor run parallel brick-lined trenches, each about 2 feet wide and 2 feet 6 inches deep with an interval a yard wide between. These trenches are filled with warm water supplied through small pipes placed just below the surface of the water. The outlet is merely an overflow gutter situated quite close to the inlet. The result is practically no circulation of water in the trenches and the accumulation of an enormous quantity of dirt from the hundreds of bodies begrimed from head to heel with coal dust and mine mud. The quantity of dirt is materially increased, too, by the custom of the coolies of washing their clothing and shoes or sandals in the same water. The excellent chances afforded for disseminating hookworm and other infection is apparent. This system was inaugurated when the coolies wore long hair and a queue but in the days of the republic coolie heads are close cropped or shaven as a rule, and the former objection to shower baths is not so valid.

The kitchens are in good sanitary condition, the food is well-cooked, of suitable variety, and sufficient quantity. The food served here can be excluded as a source of hookworm infection. This does not however hold true in the mine where the coolies eat their midnight and midday meal, and where mudstained hands and dirty clothes used to wipe out the dishes may easily infect by ingestion. The general location of the boarding houses is excellent, on a fairly steep mountain slope, on sandy soil with good drainage, and exposed to a strong and fairly constant breeze.

Incidence of Ancylostomum.

In these examinations ordinary smears were made covering about three-fourths of a 1 x 3 inch microscopic slide. No cultural or concentration methods were employed nor was any record kept of the results of treatment. In those cases which were treated, thymol was used in the manner recommended by Stiles for the Rockefeller Sanitary Commission. In all those cases in which examination was made for the worms the ancylostomum duodonale was found. Stitt (*Practical Bacteriology and Parasitiology*, 1913, p. 266) quotes the claim that where the ordinary microscopic examination for ova shows 40 per cent. infection, and concentration methods 55 per cent., cultural methods will show 99 per cent. infection. This should be recalled in the light of the figures presented here.

In the course of this study examination was made of 272 persons, of whom 225 were workers in the underground section of the mine, 19 were from the washing plants, 11 from the machine shops, 11 from the foreign staff and families, and 6 were from the valley outside the colliery. Table A shows the result of this examination. Of the 225 coolies from the entire underground works, 90.2 per cent. were found infected with hookworm, 64 per cent. with ascaris lumbricoides, and 8 per cent. with trichocephalus dispar. In no case after the hookworm ova were found was the search continued for other parasites. The figures for ascaris are therefore minimal and there is reason for believing that ascarides were actually present in from 95 to 100 per cent. No relation was found between infection with ascaris and with hookworm. The different sections covered the entire range of the mine in temperature, moisture and elevation, yet there is no significant difference in the percentage of infection, the range being from 100 per cent. in 9 sections, to 66 per cent. in the third shaft section. This latter low ratio is based on a total of but three cases and cannot weigh as an absolute figure. In those sections from which ten or more men were examined, the lowest incidence was 73 per cent. It is to be remembered also that in none of the cases reported negative, was the search extended beyond three slides and thirteen minutes. In view of the high ratio in many sections and the probability of and facilities for a uniform infection throughout, it is certain that the figures here presented are minimal, and it is most probable that corrected figures would be much higher throughout.

In the light of the points recorded in describing the above-ground units of the colliery, it is interesting to note in the washing plants an incidence of 50 per cent. and in the machine shops an incidence of 27 per cent.; figures which harmonize closely with conclusions drawn from the study of sanitary conditions in those units. Of the 11 members of the foreign staff and their families examined, three, or 27 per cent., were infected. These three were engineers whose daily routine required the supervision and inspection of underground work. No case was found in a foreigner who did not regularly visit the mine. Of the six cases examined from outside the colliery, two were infected. This proportion would be expected to hold for much larger numbers, as the chances for infection spreading from the mine to the surrounding country are abundant. These chances lie chiefly in the migration of infected coolies from the mine to other occupations outside, the use of infected sewage from the colliery as a general agricultural fertilizer, and the transportation of infected mud from the mine by various means. Of the entire 272 persons examined, a total of 222 or 81.6 per cent. were found infected with hookworm. Of the 36 persons outside of the mine proper, exclusive of the foreigners, 16, or 44 per cent., were infected.

TABLE A.

Section of colliery.	Total no. examined.	Hookworm positive.	Per cent.	Ascaris l. positive.	Per cent.	Trichocephalus.
Main Adit No. 1.....	10	10	100	8	80	
Main Adit No. 2.....	5	4	80	4	80	1
Main Adit No. 3.....	10	10	100	6	60	
Main Adit No. 4.....	15	14	93	6	40	2 Oxyuris 1
Main Adit No. 5.....	25	25	100	18	72	4
Main Adit No. 6.....	19	19	100	14	73	2
Main Adit No. 7.....	28	24	85	17	60	2
Main Adit No. 8.....	9	9	100	6	66	
Main Adit No. 9.....	15	11	73	10	66	1
Main Adit No. 10.....	1	1	100	1	100	Amœba 1
Main Adit at large....	21	16	76	15	71	1
Shaft No. 1.....	3	3	100	2	66	
Shaft No. 2.....	3	2	66	2	66	
Shaft No. 3.....	11	11	100	8	72	
Shaft No. 4.....	4	4	100	2	50	
Shaft No. 5.....	11	10	90	9	81	Ascaris C. 1
Shaft at large.....	13	10	77	10	76	
Mine at large.....	22	20	90	7	33	
Totals for mine.....	225	203	90.2	145	64	18.8 per cent
Washing plants.....	19	11	57	14	73	1
Machine shops.....	11	3	27	10	90	
Outside.....	6	2	33	3	50	1
Foreigners.....	11	3	27	0	0	
Grand total.....	272	222	81.6	172	63	20.7 per cent 3 Unidentified

In the case of routine examination, one case each was found to harbor oxyuris, ascaris canis, and amœba. Three unidentified ova were observed. A rich field is here for the study of rare entozoa.

A study of the clinical effects of ancylostomiasis in the mine coolies presents many difficulties. The general physical average is far below a similar average for European or American miners and where the European miner averages one ton of coal per day output, the Ping Hsiang miner averages less than half this amount. Practically all of the coolies show some physical abnormality. The average coolie is undersized, short, under normal weight for height, pallid, stooped and unsymmetrically developed. This general poor physical condition cannot be laid at the door of the hookworm, because the mine coolies are constantly being recruited from the farming districts of the provinces close by, and are presumably not infected in a

large proportion when they come to the colliery, and also because a similar proportion of poor physique is found elsewhere and in other strata of society. Complete physical examination and measurements were made by the physical department of the Yale College in China of 112 students between the ages of 14 and 21. These men were drawn from the best Chinese families and are presumably the best physical stock that central China can produce. Among them no hookworm was found, yet 25 per cent. showed poor general physical condition, 53 per cent. fair, and but 22 per cent. were in good condition. The system was the same as at Yale University.

The hookworm alone therefore cannot be charged with entire responsibility for the very poor general physical condition of the coolies of the colliery. That the disease is, however, a strong contributory element, admits of no doubt. It is unnecessary here to discuss in detail the influence of hookworm infection on concurrent and sequent disease conditions and on economic efficiency. Suffice it to say that a considerable proportion of the invaliding at the colliery must be due indirectly to this cause. Pulmonary tuberculosis is here as always the scourge of China, and the readiness and speed with which it develops and spreads are explicable in the light of the hookworm incidence. The weakened vitality and lowered threshold of infection due to ancylostomiasis not only cut down the daily output of coal per man but they pave the way for an extremely high rate of disease incidence and mortality. A consideration of no mean importance is the havoc which epidemic disease would make should it once gain a foothold under such circumstances.

In spite of these indubitable facts, Table B shows that exactly the same percentage of the 77 cases examined from the colliery hospital were infected with hookworm as of the 187 cases examined directly from their work in the colliery. In each case the incidence is 80 per cent. This fact is not to be explained by the assumption that hookworm disease has no direct

TABLE B.

	Total examined.	Hookworm.	
		Positive	Per cent.
Hospital	77	62	80.5
From work	187	151	80.7

influence in determining a higher disease incidence, but rather indeed by the supposition already referred to, that in the underground works the infection is nearly if not quite universal and hence no valid comparison is

possible between hospital patients from the mine and the coolies actually at work in the mine with regard to their relative infection with hookworm. Rather a comparison must be drawn between the incidence of disease in general among the mine coolies and among a corresponding group of farmers, artisans and tradesmen outside the mine, in relation to the hookworm as a predisposing factor. The incidence of disease in general in the miners is distinctly higher than outside but exact comparative figures cannot now be given.

TABLE C.

Infection by Ages.

Age.	Plus.	Minus.	Per cent. plus.
Less than 10	0	1	
10–19	16	4	80
20–29	90	19	82
30–39	81	10	89
40–49	24	7	77
50–up	5	1	83

TABLE D.

Native town.

Town.	Positive.	Negative.	Per cent. positive.
Ping Hsiang	101	12	89
Siangtan	45	9	83
Liling	40	8	83
Hupeh	27	7	80
Liuyang	29	3	90
Hengshan	7	2	77
Changsha	7	1	87
Scattered	10	6	62

In Table C is shown the incidence of hookworm disease by ages, each decade being grouped separately. No significant variation is found nor is there any reason here for regarding age as influencing at all the relative degree of infection. The same may be said of Table D, showing the incidence according to the native towns from which different groups of coolies come

The important factor is not the precedent condition or place but it is simply the fact of employment in the mine. Table E shows the relative incidence according to the length of employment in the mine and again no conclusions can be drawn as the figures are on the whole comparatively uniform and show no relation between length of employment and infection. Even in the first month positive cases appear and this might be assumed to support the view that ingestion of the ova in the mine with the food is a common and frequently repeated proceeding. These tables all indicate that a detailed and complete cultural examination would show an almost universal underground infection.

With the exception of three cases in which three slides were prepared, only one or two slides were examined. Of the total number of cases examined, 77 per cent. showed hookworm ova on the first slide and on the first slide were found 95 per cent. of all the positive cases (Table F). On the second slide 3.6 per cent. of all examined were positive, and 4.4 per cent. of all the positive cases were on the second slide. Remembering the customary infrequency of hookworm eggs in positive cases examined by this method and the fact that in none of these cases was a preliminary purgative employed, it is apparent that the infection must be heavy in a majority of the cases. Stiles recommends the examination of ten slides, taking one hour for the task before a definite negative opinion can be given. Here the indications are that such a procedure would have given a percentage positive approaching very near 100.

TABLE E.

Time in colliery.	Positive.	Negative.	Per cent. positive.
1 month	4	0	100
2 months	11	2	84
3 months	8	2	80
4 months	1	5	16
5 months	3	0	100
6 months	5	0	100
1 year	16	6	72
2 years	28	5	84
3 years	34	4	89
4 years	7	4	63
5 years and over	101	12	89

TABLE F

Slides examined.

Slide number.	Positive.	Negative.	Per cent.
1	212	5	95 per cent. of all positive 77 per cent. of all examined
2	10	43	4.4 per cent. of all positive 3.6 per cent. of all examined
3	2	1	

Reviewing the number of minutes per examination necessary to find the first hookworm egg (Table G), it is seen that in one out of every ten cases, an egg was in the first field brought into focus. The largest percentage, 32 per cent; were found within one minute and 83 per cent. were found within five minutes. In no case was the search prolonged beyond thirteen minutes.

TABLE G.

Time of examination.

Minutes.	Positive.	Negative.	Per cent. of total positive.
0	22	0	10
1	49	0	22
2	37	0	17
3	40	0	18
4	18	0	8
5	12	0	6
6	11	1	4
7	11	0	4
8	3	3	1
9	6	6	2
10	8	13	4
11	3	11	1
12	3	14	1
13	0	3	0

Other Disease Factors in the Mine.

Certain other disease factors are present in the Ping Hsiang Colliery whose importance lies not so definitely in the propagation of ancylostomum as in other lines. Here may be cited the innumerable rats which infest the mine. All of the underground passages require heavy timbering, and where drifts are directly in the coal seams, a layer of pine twigs, ferns and straw is placed directly against the coal and sand to prevent the dust from drifting in and starting excavations of increasing size. This fine brush is supported by the timbering and furnishes first-rate nesting facilities for the rats. The rats exist in enormous numbers. The moisture, darkness and warmth are favorable to them and they subsist on the innumerable cockroaches, the leavings of the coolies' food and the fecal material. The rat question would assume primary importance in the event of the introduction of plague, and here where this danger is always to be feared, rat eradication should be among the earliest sanitary measures to be inaugurated.

Numerous ants worry the miners and large scorpions are found although stings from the latter are seldom reported. Worthy of special investigation is a peculiar dermatitis which is of comparatively frequent occurrence among the mine employees and which is ascribed to contact with the water in certain sections of the mine. The causation is quite unknown although a chemical irritant is probably at fault. As the coolies leave the mine they come from the various hot and humid laterals to the electric tramway of the main adit, which carries them at a high speed for the 2,000 and more metres to the surface. The coolies are half-naked, tired with a long twelve-hour shift and over-heated. The chilling from the fast ride to the surface easily conduces to decrease their body resistance and predisposes to respiratory and enteric affections. In many of the hotter drifts the coolies work naked and practically everywhere they are barefooted or at most shod with rough straw sandals. Thus every opportunity is afforded for the hookworm larvæ to penetrate the skin, not alone of the feet and hands but of the entire body. No particular attention is attracted by ground-itch or analogous conditions but the great frequency of eczemas, furunculosis and minor ulcerations strongly suggests that many of these latter conditions may conceal or spring from a precedent larval puncture of the skin. Again the extremely large number of cut and contused hands and feet affords great chance for larval entrance.

Recommendations.

There can be no question of the desirability from the standpoint of the company and the coolies, as well as of the surrounding country, of eradicating hookworm infection from the Ping Hsiang Colliery. In the way, however, of accomplishing this eradication are certain difficulties hard or im-

possible for one to appreciate who is not familiar at first hand with local Chinese conditions. These difficulties may be briefly capitulated as follows. Money for sanitary improvement is sadly lacking in China today and only definite proof of definite financial advantage is apt to evoke it. Human labor and life are the cheapest commodities purchasable in the open market and there is no public sentiment, and but little private, tending toward a better state of affairs. The foreign staff at the colliery will use every means at its power to improve sanitary and social conditions among coolies but it remains to be seen what can be accomplished against the conservative and indifferent *laissez faire* of the Chinese officials. The company is not in sound financial condition and money for sanitation is therefore the harder to expect.

Again the Chinese coolie and his guild are a law to themselves and with the profound and supercilious scorn of complete sanitary ignorance, regard with indifference, derision or suspicion much of what is attempted in the way of sanitary improvement and health conservation. Conditions would be easier if the company could control its employees and force them to follow instructions. Unfortunately this happy condition does not obtain and outside of the actual mining operations, the company has only nominal control. In view of these circumstances therefore, sweeping changes are out of the question, and the problem must be approached absolutely from the standpoint of what is practical and really possible. Sanitary reform in China is a matter of generations and the eradication of hookworm disease from the deep mines in general and from the Ping Hsiang Colliery in particular, will be no whit easier than the same job has been in the mines of western lands, but on the contrary far more difficult and time-consuming. The following recommendations are made with the above sketched conditions sharply in mind, and after deliberate consideration of the various possibilities.

1. Education is necessary at two points. (1) Education of the head-men of the gangs and sections of the mine. This should take the form of the presentation in informal lectures of the nature and cause of hookworm disease, its economic and individual significance, its history in other lands, and the means of curing, preventing and eradicating it. These lectures should be accompanied by lantern pictures illustrating every point discussed. The lecture system should be accompanied and followed by a direct appeal to the head-men to coöperate with the company in the effort to eradicate the disease, and their coöperation should be made practical by making them responsible for the institution of the measures hereafter described. (2) Education of the coolies by simpler illustrated talks given in the barracks by Chinese assistants, and by distribution of printed matter stating in very plain language what the disease is, how it spreads and how it may be prevented and cured.

2. Division of the mine into about thirty sanitary districts with the native head-man over each responsible for carrying out certain definite procedures in it. Each mine section could be divided into two sanitary sections with the regular native officials in charge as sanitary officers. About five sanitary sections should be combined under a higher official who would act as general sanitary inspector with general supervision over his district. The sanitary inspectors should report to and be directly responsible to the foreign mine physician for the sanitary condition of their respective sections. The mine physician should coördinate and regulate the sanitary measures taken throughout the mine.

3. Posting of numerous plainly-worded Chinese bulletins on hookworm disease, at all points in the mine where coolies congregate, in the boarding houses and other effective places. Posting in the mine as well as in the boarding houses of the definite rules described in the next section.

4. In the mine, buckets should be placed at frequent intervals for feces and urine, and the use of these alone should be strictly enforced by the sanitary staff. Frequent inspections of every part of the mine should be made by the mine physician with a view to securing strict enforcement of this rule as well as to devise new and special measures for localized conditions. The latrine buckets should have a suitable disinfectant put in them and should be carried out of the mine on special cars twice in each twenty-four hours and emptied into the boarding house latrines, scalded, disinfectant replaced, and returned to the mine. Disobedience of the strict rule against defecation elsewhere than in the buckets provided, should entail a definite fine to be deducted from the pay, and in cases where the particular offender cannot be determined, should be assessed against the sanitary section in which it occurs.

5. A system of regular examinations should be instituted covering all persons enrolled with the colliery. The writer demonstrated the feasibility of examining fifty men per day for hookworm infection with the aid of a properly trained Chinese staff, in addition to supervising the usual routine of the hospital. Even the microscopic work can be delegated to a suitable assistant after a time. All positive cases should receive treatment during the half day they are at the hospital for examination. This would best be conducted by administering Epsom salts to all and examining the resultant stools for ova. Positive cases could then immediately receive half of the total degree of thymol, and two hours later the second half. The final dose of Epsom salts could be taken after returning to the barracks. Each person examined should receive a dated certificate stating the result and whether treatment had been administered. These certificates should be checked up by the sanitary inspectors in the mine, and those not having them should be fined. This system would easily allow a complete round of the employees twice yearly and would afford a most valuable means of eliminat-

ing the disease. All new employees should be examined before entering service.

6. In addition to the required examinations, all infected hospital patients should be treated as well as all persons who apply for treatment in the daily clinics.

7. The same system of sanitary supervision should be instituted in the above-ground units as in the mine.

8. The boarding house latrines should be enlarged, and be made the depository for all buckets and containers of fecal material from the mine and above-ground works. The shape and arrangement of the latrines at present is satisfactory but each should be double, having a solid partition wall extending from the floor of the pit to at least six feet above the ground-level floor. Each side of the house should have its own entrance and the pits should be cement lined. The two sides should be used alternately and never at the same time. During the week or such interval as one side is in use, the opposite side should be closed and converted into a septic tank for the disinfection of the fecal and urinary matter and the destruction of hookworm ova and larva. After such a period as may be necessary to accomplish this, as determined by exhaustive bacteriological and microscopic examinations, the back of the closed pit should be thrown open to the farmers as at present and the entire contents removed. This pit should then be opened as a latrine and the opposite one closed and treated in a similar manner.

9. The bath-houses should be remodelled, the brick floors and trenches being replaced by a cement floor with a concave curve from side to side, and an efficient drainage slope from end to end. Over this should be laid a floor of wooden or metal gratings which could be taken up for scrubbing and scalding at frequent intervals, permitting also thorough flushing and cleaning of the underlying cement. Water should be supplied at a definite temperature from overhead pipes. Low wooden benches can be placed under the showers if desired and clothes racks around the walls.

10. Machinery taken from the mine to the shops to be repaired should be thoroughly washed before leaving the mine.

11. Accurate statistical and progress records should be kept by the mine physician covering every phase of sanitary activity.

Conclusions.

1. The geographical location, geological formations and meteorological conditions at the Ping Hsaing Colliery are decidedly favorable to hookworm infection.

2. The native mines, from which the water supply of the colliery is drained, are undoubtedly heavily infected, and are a potential source of danger to the colliery, and probably an actual danger. Investigation of the

conditions affecting hookworm infection in the native mines is urgently necessary.

3. Conditions in the underground works of the colliery are highly favorable to the propagation and dissemination of hookworm infection, in the particulars of excessive moisture, high temperatures, darkness, constant re-infection by promiscuous defecation, the habits and clothing of the coolies, and the lack of special provisions for sanitary control.

4. Examination of 272 persons showed a general incidence of 81.6 per cent. Of the 225 who worked underground, 90.2 per cent. were found infected. The ratio of incidence was much less in the above-ground works and the infection was also found present entirely outside the colliery.

5. Evidence is deduced indicating that the 90.2 per cent. infection in the mine is a minimal figure and that the true figure approaches 100 per cent.

6. The only factors determining the rate of incidence are conditions in the mine itself.

7. Eradication will be peculiarly difficult and slow but can be accomplished along lines here recommended.

8. This study indicates forcibly the need for intensive investigation of hookworm infection in Hunan, and Kiangsi Provinces, where the disease is apparently a largely unsuspected factor in economic industrial and social ineffieciency.

NOTE: The writer is indebted for much of the information presented, particularly in respect of the native mines and the technical features of the Ping Hsiang Colliery, to the kindly and courteous assistance and coöperation of Mr. Leinung, Mr. Esterer, and Mr. Schlifter, of the German Engineering Staff of the colliery.

SANITATION IN BRAZIL.

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Brazil, the vast country south of us, of greater area than the United States (excluding Alaska), has for the past twenty years been undergoing a great industrial development. The agricultural and commercial advantages of the country have been recognized by the Brazilians, Europeans, and, to some extent, Americans, and the southern section of the country has become more and more thickly populated by the influx of immigration and by the development of manufacturing and of the import and export trade.

Large centers of population, such as Rio de Janeiro with nearly a million inhabitants, and the City of Sao Paulo with its half a million people, have become commercial centers of great importance. Consequently, the shipping in such ports as Pernambuco, Bahia, Rio de Janeiro and Santos has had its corresponding increase.

As a result of this, and of the fact that the climate of Brazil, varying from tropical in the north to semitropical or mildly temperate in the south, is favorable to the spread of contagious diseases, Brazil has, in the past, been notorious for its epidemics of yellow fever, typhoid, malaria, dysentery, cholera, and a large number of other infectious diseases. As recently as 1900, ships stopping at Brazilian ports would very often lose the greater part of their crews by the ravages of yellow fever. Europeans, unaccustomed to the climate, and not immune to the various diseases as were the greater portion of the native Brazilians, were stricken in large numbers throughout the country. In fact, every community in Brazil was suffering under a high mortality due to infectious diseases.

The Brazilians, realizing the necessity of extreme sanitary measures, and profiting by the experiments and examples of American and European sanitarians, adopted strict regulations and spent enormous sums for the eradication of epidemics. The principal work of this kind was begun by the Federal district, Rio de Janeiro, and closely followed by the State of Sao Paulo, the most highly developed and progressive state in Brazil; and these in turn by the organization of sanitary commissions in various other states of the Union and by the activities of the municipal boards of health.

THE FEDERAL PUBLIC HEALTH SERVICE.

The Federal Department of Health has jurisdiction over the health of the ports, the quarantine and disinfection of ships or vessels, the sanitation of the Federal District of Rio de Janeiro, and to aid the various State Commissions in their work.

It was not until 1903 that the Government seriously undertook its campaign, at which time the eminent sanitarian, Dr. Oswaldo Cruz, was given full authority, as Director-General of the Public Health Service, to eradicate the diseases which were making the city of Rio de Janeiro the plague spot of the world. The first appropriation was for $1,700,000, followed by approximately $1,300,000 each year since.

Profiting by the experiments and observations of Drs. Finlay, Reed, Carroll, Agramonte, Lazear, Guiteras, etc., proving the agency of the

A section of the city of Rio de Janeiro, showing the sea wall and esplanade skirting the edge of the bay, the parks and paved streets of the city. All the buildings are of brick and stucco and all have tile roofs.

Stegomyia Fasciata in the propagation of yellow fever, the extermination of the mosquito was the first thing undertaken. All stagnant and slow-moving water within the city and in the outlying districts was drained by means of canals and sewers; the complete cleaning of the city was undertaken by the razing of all buildings the sanitary conditions of which were questionable, the paving of hundreds of miles of streets by asphalt or granite blocks, the widening of all principal streets, the construction of large wide avenues, and rigid sanitary inspection. A large force of inspectors still visit about sixteen thousand houses per week sealing all open receptacles of water, such as water-closet flush tanks, with paper, on which is written the date and signature of the inspector. They carefully inspect the roof and other gutters and clean out all obstructions to the ready flow of water. They also sweep away with long-handled brooms all cobwebs

occurring in inaccessible spots to exterminate all insects as far as possible. One procedure of attacking the mosquito is of particular interest because, contrary to the usual method employed where the surface of all still water is covered with a layer of oil, all ponds, lakes, marshes, canals, rivers, etc., are provided with large quantities of a small and voracious fish, the "Barrigudo," which devour the larvæ of all species of mosquitoes.

The work of cleaning the city was greatly aided, to a certain extent unintentionally, by the construction of immense docks of masonry and concrete along a large part of the waterfront and by the building of a long granite sea wall and beautiful esplanade along the remainder.

An English company, the City of Rio de Janeiro Improvements Company, was given a concession to install sanitary sewers throughout the whole city, and to install all house plumbing in both old and new buildings.

Sanitary laws were passed providing for the quarantine and isolation of contagious diseases, vaccination, disinfection, inspections of various kinds, strict laws regarding buildings, etc. These are very similar to the requirements of the State of Sao Paulo, and a description later of the laws of this state will, I believe, be sufficient for a general description of the progress that has been made in sanitation in Brazil.

The water supply is now taken from a range of mountains not far from the city. The water is clear, sparkling and free from pollution; and is regularly and carefully analyzed by the Government chemists and bacteriologists.

Rio de Janeiro is now a healthful, clean, and beautiful city. The general mortality from all causes has been reduced over fifty per cent. from the time when yellow fever was prevalent. Good air, good water, proper disposition of the wastes of the community, the extermination of mosquitoes, flies, and as many other insects as possible, excellent sanitary laws, efficient medical inspection of all contagious diseases, publicity of the public health work by the distribution of circulars and by articles in the newspapers almost daily, and cleanliness, have resulted in making Rio a modern livable city which will be an everlasting credit to the progressiveness and ability of the Brazilian people.

The State Health Departments.

The Health Commissions of the various states of Brazil play by far the most important part in the supervision and protection of the public health. A description of the organization, the most important laws, and the results of the Sanitary Service, "O Serviço Sanitario," of the State of Sao Paulo, as the most advanced state of Brazil both in this and in other respects, will be a typical example of the sanitation throughout the country, only perhaps more extensive on account of the greater density of population compared with the other States.

As in Rio de Janeiro, the work of exterminating yellow fever, typhoid, etc. was not seriously undertaken until 1903, although in some cities, such

as Santos, part of the work had been started earlier. At this time large appropriations were made for the work, a strict code of laws enacted, and a large organization formed.

The Act of the State Legislature pronounces the duties of the State Sanitary Commission to be as follows:

1. The scientific study of all questions relative to the Public Health.

2. The study of the nature, etiology, treatment and prophylaxsis of infectious diseases which appear or develop at any point in the state and scientific researches along these lines pertaining to the public health.

3. Examinations of the hygienic conditions of a. The Air; b. Water supplies, sewerage, etc.; c. The Ground and the Vegetation.

4. The study of the flora of the state from a therapeutic point of view.

5. The execution of necessary active or protective measures for general hygiene, the sanitary policing of schools, of private and general dwellings, of the sellers of wholesale and retail drugs, factories, all industrial and commercial establishments, all hospitals, market places, slaughter houses, cemeteries, all public places and thoroughfares, for the maintenance of hospitals for infectious diseases, isolation and disinfection.

6. General preventive measures for the public health, especially those protective against transmissible diseases.

7. The recording of the vital statistics of the state, which shall include all the information which can be collected regarding the causes of diseases and deaths.

8. The preparation of cultures, vaccines, serums, antitoxins, etc., and the inspection of the preparation of such products in institutions and laboratories.

9. The supervision of the practise of medicine in all its branches, of pharmacy, dentistry and obstetrics.

10. The examination of wet nurses and the inspection and analysis of their milk.

11. The examination of the infants of the indigenous.

12. The inspection of foods, drinks, especially of wines and mineral waters.

13. The medical inspection of public schools and of pupils.

14. Inspection of all sanitary works and supervision of all sanitary measures of municipalities.

15. The diffusion of the general principles of public health by the distribution of circulars and pamphlets on the laws, regulations, and instructions pertaining to public hygiene.

For the execution of these duties, the Sanitary Service is divided into the following sections, all under the office of the Director-General of the Service.

1. Department of Bacteriology.

2. Chemical Laboratory.

3. Department of Smallpox Vaccine.
4. Disinfection.
5. Demographical Statistics.
6. Pharmaceutical Laboratory.
7. Isolation Hospitals.
8. Lazaretos, Quarantine and Observation Stations.
9. The Serumtherapeutic Institute.
10. Inspection of Wet Nurses.
11. Department of Sanitary Engineering.

The total number of people employed varies between 300 and 500, depending upon the general prevalence of diseases in the state. The grounds, buildings and equipments of the various branches of the Service are spread about the entire state, and offices, hospitals, laboratories, and vehicles of all kinds which are maintained in all important centers, required an immense amount of capital for the original purchase and erection; and the maintenance of these, together with the salaries of the personnel, requires an annual appropriation of about one half a million dollars. This must be acknowledged as remarkable when we consider that the population of the state is but 3,000,000. How many of our states spend $500,000 a year for the public health!

An expensive, but very important and well-known department of the service is the Serumtherapeutic Institute, the principal duty of which is the preparation of serums for the prevention of death due to snake-bites. Brazil is infested throughout the whole country with large numbers of various kinds of venomous snakes, which have caused a very large mortality in the past. This institution now maintains a large snake farm, receiving snakes from all parts of the country, where the venom is extracted from the fangs, inoculations made upon mules, horses and other animals, and the various serums extracted. The serum is sent free of charge to those who have contributed snakes, and at a nominal cost to others requiring it. This work has met with enormous success.

In addition to the laws covering the various duties and requirements of the above-mentioned departments, a general code of laws is in effect, which the general inspectors or the officers of the different sections of the Service enforce accordingly as the cases come under their jurisdiction. As these laws are very full and complete as to detail, I shall endeavor to describe the general character and some of the more radical of them.

The laws regulating the practise of medicine require strict examination of physicians and surgeons; diplomas from recognized medical schools; registration; standard forms of prescriptions; prohibit physicians and surgeons from selling or dispensing drugs (except in cases where there are no pharmacies within a distance of three kilometers); no partnerships or contracts permitted with pharmacists; require all transmissible cases to be

immediately reported; specify procedures in various cases, violations of either to be heavily fined.

The practise of obstetrics, dentistry and pharmacy are similarly regulated. All pharmacies and sellers of drugs and surgical instruments are furnished with lists of drugs, chemicals, instruments, materials, etc., which they are required to keep in stock at all times.

Schools have strictly enforced regulations. In addition to the medical examinations of the pupils, the lighting, ventilation, etc., must comply with the specifications of the Service. The construction, sanitation and safety

The Serumtherapeutic Institute and Snake Farm.

for employees, in factories and workshops are provided for. For ventilation there must be at least eight cubic meters of air space for each employee, and the ventilation must provide 35 cubic meters of air per hour to each person. No children under 10 years may be employed, and those of from 10 to 12 must be given light work; for night work no one under 18 is allowed; vaccination is required; and one water closet for every 40 males and one for every 25 females.

The laws governing the sanitation of residences and buildings are very strict and rigidly enforced. These come under the jurisdiction of the Sanitary Engineering department of the Service, and all plans for buildings and sanitary works must have the acceptance and signature of the nearest executive officer. In every building, all kitchens, pantries, waterclosets and bathrooms are required to have their floors of masonry construction (preferably of reinforced concrete), covered with terra cotta tiles (no cement tiles being permitted on account of their porosity); and the walls of these rooms must be lined with glazed tiles to a height of about five feet

six inches. This is the case with every building regardless of size or cost. There is also a long list of requirements regarding the arrangement of the rooms, the lighting, ventilation, partitions (the use of wooden partitions is prohibited except in very special cases), specifications for plumbing, prevention of dampness, and the covering of all containers of water in order to avoid insects.

The laws regulating the construction and arrangements of markets, barbershops, bakeries, slaughterhouses, factories for food-products and drinks, restaurants, dairies, fruit stores, etc., all are requirements of a

A Disinfection Station.

similar sort in which concrete, terra cotta, glazed tiles and marble must be employed for floors, walls, tables and receptacles of food.

The regulations for hospitals, theatres, hotels, shops, laundries, stables, sewerage and water-supplies are broad and comprehensive, and give the State Sanitary Service complete authority over all matters sanitary; and as the Service is composed of sufficient personnel and equipment, this supervision and authority is most effective.

The following infectious diseases, when occurring at any place, must be immediately reported to the nearest office of the Service or to the municipal authorities by the physician in charge or by the nearest responsible person: Smallpox; scarlet fever; the pest; cholera; yellow fever; diphtheria; infections of childbirth; ophthalmia neonatorum in maternity hospitals; typhus, typhoid, and paratyphoid; tuberculosis; leprosy; malaria; hookworm; trachoma; purulent conjunctivitis; dysentery; whooping cough, measles and mumps in schools, asylums and collective dwellings; and any other disease which may be considered necessary by the Director-General.

Neglect of such notification is punishable by a schedule of fines. Isolation, partial or strict, at the home or in the isolation hospitals, according to the disease, must be employed in all of the above cases with the exception of hookworm, dysentery and trachoma. The removal of the patient is always done by carriages or automobiles belonging to the Service and which can be properly disinfected.

In all cases, the nearest disinfecting station sends out a force of men who proceed to make a thorough disinfection of the building and everything necessary for the elimination of all possibility of contagion. This service is performed at the expense of the state.

A medical vigilance service is in operation in all cases, which makes a daily medical inspection of all persons who have come into contact with the patient, and all persons living within certain limits as determined by the Director of the Service. Although vaccination is not compulsory, it is required in public schools and in factories; and in cases where a person has been in contact with an infectious disease and does not care to be vaccinated he is removed to a place where he cannot spread the infection and watched for the proper length of time.

Sanitation of the City of Santos.

On account of the magnitude of the work and of the special conditions and problems which arose for the sanitation of the City of Santos, the port of the State of Sao Paulo and from which the greater part of the world's coffee is shipped, a special commission was created by the state for the purpose of studying the best methods of draining and sewering the city, and to construct and maintain this work, all with state funds. This Commission is entirely separate and distinct from the regular Sanitary Service and is known as the Sanitation Commission of Santos.

The City of Santos is situated on a large island formed by the branching of a large river which empties into the Bay of Santos. The greater part of the city is low, flat and marshy, running from one to six feet above high water level. Previous to the construction of the masonry docks along the waterfront and the sanitary works of the Commission, this wet marshy land, covered with a tangled mass of low vegetation, was the ideal breeding spot for the hordes of mosquitoes which infested the entire city; and the old sewer system was entirely inadequate, so that, during heavy rains the streets were not only flooded with storm water but also with house sewage.

In 1905, under the able administration of F. S. Rodriguez de Brito, an eminent Brazilian sanitary engineer, as head of the Commission, and a large organization, the work was begun by the construction of six large canals, cutting the city from the frontage on the bay to the river on the rear; these canals in turn being fed by an elaborate system of storm sewers and sub-surface drains. The complete sewering of the city was next undertaken, a most difficult and expensive project on account of the lack

of topography which necessitated the lifting of the sewage at various points, pumping for several miles along the shore, across a large suspension bridge of 600 feet span especially built for this, and another seven miles of piping to its outlet in the ocean. Old and unsanitary house plumbing was condemned and new plumbing installed throughout the city by the Commission and paid for by the house owners.

The present work of this Commission is the maintenance of these works, the repair and construction of additions to the sewerage, the installation of all the house plumbing in the city, and the supervision and inspection of all building construction.

One of the Canals Draining the City of Santos.

When the plans for any building are completed, they must first be sent to the city engineer, who sees that the plans are in accordance with the building laws of the city, in regard to height, design, structural specifications, etc. After this, they are sent to the office of the State Sanitary Service where, if they are in accordance with the sanitary requirements already described, they are signed by the Director of the office, and are then sent to the Sanitation Commission, where a small scale plan of the building is made, showing in detail the plumbing, baths, waterclosets, etc., and a list of all the material required is furnished. No work can be started until all these signatures are on the plans. When the contractor has the building ready for the plumbing and all the material on the list at the site, he notifies the Commission and they send their crew to install the work. After it is all finished the bill is sent to the contractor or owner as the case may be for the actual cost of the work plus a small percentage for its administration.

The total cost of the work which this Commission has done in Santos, including all work up to January 1, 1912, has been $3,227,000. Of this there is about $68,000 of house installation, paid for by house owners, and since the above date there has been approximately $300,000 spent on new work.

At present a similar Commission is undertaking the work of draining and sewering the city of Pernambuco, one of the northern cities of Brazil, in an intensely tropical climate, where up to the present time yellow fever and other diseases have played havoc with the population. Within a year from now, Pernambuco will be equally as healthful as Rio, Santos and Sao Paulo.

The Municipal Health Departments.

The health departments of the various municipalities of the state are strictly under the supervision of the State Sanitary Service, and act as agents of the Service especially where the size of a city does not warrant the maintenance of a branch office.

Their duties include:

The supervision of sewerage, storm sewers, water-supplies, drainage, paving, street cleaning, and the collection and disposal of garbage.

Inspection of houses and new building construction; to enforce the State and Municipal laws.

Inspection of food, milk, etc., and general sanitation.

The organization of an emergency service, hospital, etc.

Acting as agents of the State Sanitary Service by sending all required information, and reports on the vital statistics.

Results and Statistics.

As a result of the immense sums of money spent, of the labor and effort which the Brazilians have expended for the modernizing and cleaning of their communities, and for the abolition of epidemics of infectious diseases not only common to tropical countries but to cities in Europe and in the United States, what have they gained? Have the necessary increase in taxation, the increased cost of building homes and public buildings, and the resulting inconveniences arising from compulsory isolation, quarantine, and in certain cases vaccination, been warranted by the results attained?

I have described the eradication of yellow fever from Rio de Janeiro. The State of Sao Paulo has undergone a similar metamorphosis. Figure 1 shows the mortality by yellow fever in the State of Sao Paulo from 1892 to 1909. During the few years preceding 1900 some of the larger cities of the state had begun works of a character which led to the partial extermination of the fever, without the authorities being aware of the true cause of the dissemination of the disease, as was the case in the cities of Campinas and

Santos; for in 1896, Campinas began to drain off all stagnant water, straighten the courses of streams, and the general removal of all filth and refuse, also reforms in the building laws; and Santos began about the same time the construction of its large dock system.

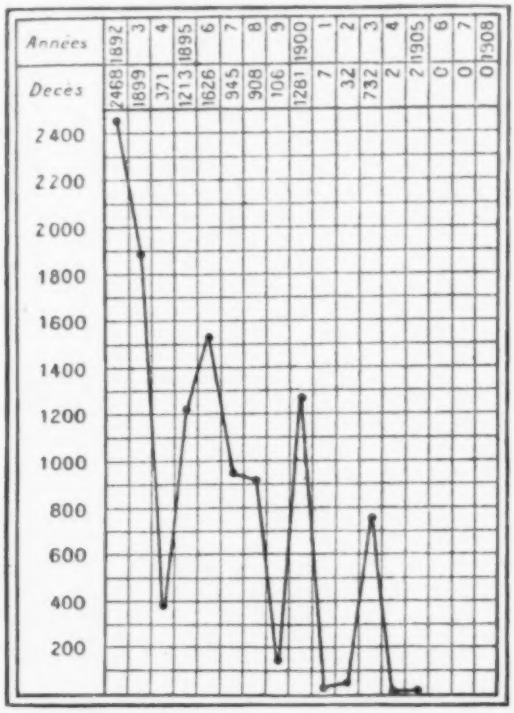

Fig. 1. State of Sao Paulo. Diagram of the mortality by yellow fever in the whole State. (1892–1908.)

But in 1903, Dr. Ribas, convinced of the truth of the deductions at Havana, and after making a series of experiments himself similar to those made in Cuba, as Director-General of the State Sanitary Service, began a campaign against yellow fever and malaria by the eradication of every possible breeding place of the mosquito, and purposely abstained from the disinfection of houses, clothes, etc., connected with yellow fever patients in order to give further proof to his contentions. In Soracaba, a town of fifteen thousand inhabitants, 2,322 cases of yellow fever were reported the year in which the work of sanitation was begun. The following year there was not one case, nor has there been one since.

Since 1903, yellow fever in both Santos and Campinas has been practically exterminated. Other cities in the state also show the same remarkable absence of the disease during the years following 1903.

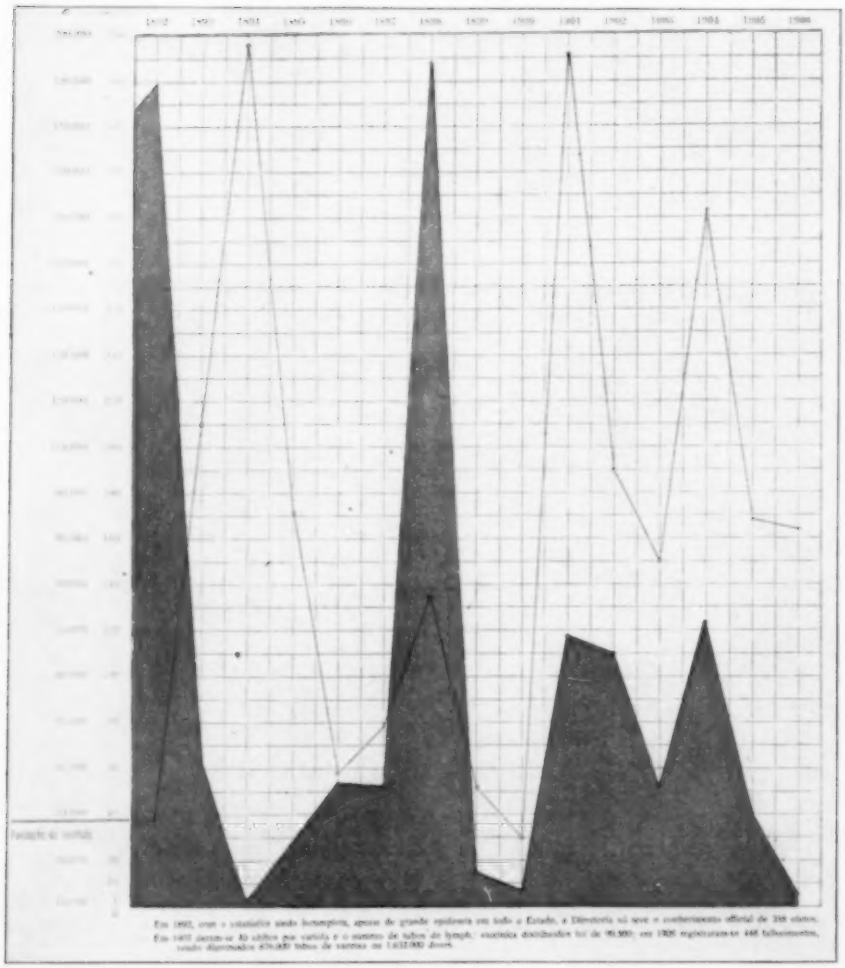

Fig. 2. The Relation between the Distribution of Vaccine and the Mortality by Smallpox in the State of Sao Paulo. The shaded portion represents the deaths and the single line represents the number of vaccine distributed.

In 1892 the first Department of Smallpox Vaccine was created on account of the prevalence of the disease at that time, and Figure 2 will show better than words the relation between the distribution (which is free) of the vaccine and the extent of the disease throughout the state. At present smallpox is of very rare occurrence and when a case does occur, the steps taken to prevent its spread are so prompt and effective that an epidemic is practically impossible.

Typhoid fever and other similar intestinal diseases have all undergone a similar reduction in their extent, and show similar falls in their mortality charts during the years in which active sanitary measures were begun

An Isolation Hospital in the State of Sao Paulo.

against them by the organization of an efficient health organization. A great deal of attention was paid in this respect to the extermination of breeding places of the fly and other insects, the food and milk supply, the general sanitary conditions of dwellings and their plumbing, and by the selection and construction of waterworks supplying water as pure as modern science will permit.

The City of Santos is now, purely on account of the sanitary changes which have been effected, a beautiful, healthful city, the health resort of the state. Every year from June to September, the numerous hotels are filled with people from the interior of the state for the purpose of bathing and recreation. A few years ago it was shunned by everyone, and was the exponent of sickness and death.

The cities of the State of Sao Paulo, and others in which proper sanitary organizations have been formed, such as the states of Minas Geraes, Parana and Rio Grande de Sul, have become clean, healthful, livable, modern and

prosperous in proportion to the extent into which they have entered upon the work of sanitation.

The natural result of such organizations above described has been an unqualified success in the suppression of some, and in the elimination of other diseases. In whatever parts of Brazil such work has been initiated, there has always been the resulting cleanliness and salubrity. The State of Sao Paulo leads the remainder of Brazil in its efficient sanitary system, with the exception of the Federal District. The states south and adjacent to it maintain health departments which approach that of Sao Paulo very closely, while most of the states to the northward are only now engaging upon the work of sanitation, as the states of Bahia and Pernambuco are doing now. The interior states, on account of the small proportion of settled territory, have no populous centers, and the work of sanitation is that of rural communities and which diminishes rapidly as it approaches the wilderness, which is inhabited only by Indians.

The cities of the extreme north near the equator labor under the disadvantage of what may be termed the most intensely tropical and dangerous climate in the world; but in the case of Sao Paulo, although it may be said that it has been necessary to employ such drastic measures as these on account of the climate, the work of sanitation has been performed in a climate almost identical with that of our State of Texas, with the exception perhaps of Santos (and Rio de Janeiro), as the greater portion of the state is some 2,000 feet above sea-level. It is dry and during the winter season cool; a climate favorable for the production of coffee, alfalfa, cotton, cattle, and similar products.

We must acknowledge and respect the intelligence, progressiveness, and ability in science and administration of the Brazilian doctors, engineers and executives who have, unaided, except by precedent, produced the results which they have attained in their country, and the Brazilian people who have by their coöperation made the work of sanitation possible. The men who are in charge of this work are very hardworking and serious-minded scientists, who have traveled extensively for the purpose of studying conditions in other countries. For their work, Europe has not been slow in honoring these men, and it was only this year that the Chair of Bacteriology was offered to Dr. Oswaldo Cruz by the University of Berlin.

It may be true, that in the application of their laws there have been mistakes made, in certain cases there is some misdirected energy, money has been spent in certain ways which might have been placed to better advantage in other directions, the supervision of some parts of the work by experienced experts might have resulted more economically but not more effectively; their methods in some respects may differ from ours; but the results attained, the spirit in which this work has been undertaken must compel our admiration and serve as an example to a large number of our own communities.

AN IMPROVED (DURHAM) FERMENTATION TUBE.

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The fermentation tube plays a part not unimportant in the determination of bacterial forms, in particular those organisms comprising the colon-dysentery-typhoid group. Since the bacteriological sanitary analysis of water and raw foods rests primarily upon the determination of gas-forming intestinal bacteria, it is here that the use of the fermentation tube has found its greatest application, not only in the determination of types but in the presumptive tests for B. coli as well.

It is interesting to note that Smith[1] found the fermentation tube an apparatus of considerable antiquity and of uncertain origin; in Detmer's Pflanzenphysiologischen Practicum it was figured as Kühnesches Gefährungsgefäss. It had been more recently utilized by Einhorn[2] for the quantitative determination of sugar in urine and by Doremus[3] for the estimation of urea, but its first application in bacteriology was by Smith[4] in 1889 for the purpose of securing anærobiosis and in several publications[5 6] he emphasized its fundamental usefulness for the detection of gas formed by bacteria in media containing carbohydrates.

A modification was suggested by Hill[7] consisting of a thimble-shaped stopper in the closed branch to facilitate cleaning, filling, and examination of the inclosed gas without disturbing the culture fluid.

It was a distinct advance from the viewpoint of cheapness of first cost, ease of manipulation and freedom from breakage, when Durham[8] proposed, and later[9] applied successfully in studying the colon-dysentery-typhoid group, the combination of test tube and inverted vial which until recently has been presumed to be equal in effect to the original fermentation tube of Smith.

Smith, Brown, and Walker[10] revived the interest of bacteriologists in the study of anærobic bacteria by pointing out the value of milk as a culture medium in the fermentation tube utilized for this purpose, and our best knowledge concerning the intestinal flora, ærobic and anærobic, rests upon the researches of Herter and Ward[11], Herter and Kendall[12], and Kendall[13] using the Smith type of fermentation tube. It remains yet to be seen if the Durham fermentation tube can be substituted entirely for the Smith tube in this type of work.

The strongest objection to the Durham tube would seem to be the difficulty of qualitative and quantitative determination of the gas. But such determinations in the Smith tube are futile, as Durham[9] points out, due to the varying absorption of CO_2 by the culture fluid. Keyes[14] more recently

reiterated the inutility of the ordinary fermentation tube for quantitative work and pointed out three factors which contribute to its unsuitability, namely (a) decreasing contribution of gas from a given volume of culture fluid to the closed branch, (b) solution of the gases due to their partial pressures, and (c) loss by diffusion through the liquid to the exterior. Keyes developed a method of obtaining the gas from B. coli under conditions suitable for analysis, at the same time excluding the factor of partial pressure of the atmosphere.

My interest in the question of efficacy of the Durham fermentation tube was aroused by a note upon this subject by Browne[15]. In making bacteriological tests upon the shell water of oysters suspected of harboring intestinal bacteria he was lead to a comparison between the Smith fermentation tube and the inverted vial tube of Durham with the following results:

TABLE I.

PERCENTAGE OF EFFICIENCY.

Amount of fluid inoculated.	(Smith) Fermentation tube.		(Durham) Inverted vial.	
	24 hours.	48 hours.	24 hours.	48 hours.
1 cc.	84.6%	94.3%	92.3%	96.1%
0.1 cc.	86.5%	90.3%	59.5%	84.6%
0.01 cc.	32.6%	23.0%	23.0%	42.3%

From this table, constructed upon the basis of tests in lactose peptone bile, the following conclusions were drawn, namely, that, "inverted vials seem to be more efficacious in the low dilutions than the fermentation tube," while, "fermentation tubes seem to be more efficacious in the higher dilutions than the inverted vial," showing that, "it is not safe to depend upon single tubes to demonstrate fermentation," but that, "duplicates should always be used and if possible triplicates."

Although Browne did not offer any explanation of the data displayed it may be easily inferred that the reason for the irregular results with the Durham tube in the higher dilutions rests upon the fact of insufficient communication between the inside and outside of the vial, due to the square end of the latter which fits rather snugly against the bottom of the test tube. In the case of non-motile organisms especially a longer time would be required to reach the inside of such a vial than with the Smith fermentation tube. It is the purpose of this paper to show the possibility of overcoming this objection to the usual type of Durham fermentation tube.

EXPERIMENT I.

The following test was made using in one half the series of tubes an inverted vial having the open end ground to an angle of 45° thus allowing freer communication between the fluid outside the vial and that inside, while in the other half of the series a similar sized vial with the end cut squarely across was used. These vials were 4.4 cm. long and 0.8 cm. in diameter, being placed in test tubes 12.2 cm. long and 1.6 cm. in diameter.* The combined tubes were filled half full with azolitmin dextrose (1 per cent.) bouillon and sterilized on three successive days in the Arnold sterilizer.

It was noted that while decolorization took place during sterilization throughout the liquid that the color returned on cooling the bouillon inside the vial only in the case of the diagonally-cut vial; the fluid outside the squarely-cut vial resumed its color also but that inside remained of a straw-yellow hue. This is a familiar phenomenon and is due to the reduction of the oxygen from the azolitmin, the color reappearing on absorption from the air. This observation indicates that anærobic conditions inside the diagonally-cut vial are less perfect than in the squarely-cut vial.

Ten sterilized tubes of each combination for each dilution were inoculated each with 1 cc. of a suspension of a 24-hour broth culture of *B. coli communior* in distilled water in the dilutions noted in Table II and then incubated at 37° C. for 24 hours. A Litmus lactose agar plate was also made for each dilution to determine the number of organisms inoculated. The results show no difference, there being an equal amount of gas in each of the eighty tubes employed.

TABLE II.

NUMBER OF TUBES AND PERCENTAGE OF GAS FORMED BY B. COLI COMMUNIOR IN DIAGONAL AND SQUARE DURHAM VIALS.

Dilution.	Square vial.	Diagonal vial.	Litmus lactose plate.
	Inc. 37°C. 24 hours.	24 hours.	
1–10	100% 10 tubes	100% 10 tubes	Uncountable
1–100	100% 10 tubes	100% 10 tubes	Uncountable
1–1,000	100% 10 tubes	100% 10 tubes	About 10,000 colonies
1–10,000	100% 10 tubes	100% 10 tubes	About 1,000 colonies

*A ready cut vial of even better dimensions, *i. e.*, 5.1 cm. in length and 0.5 cm. in diameter is obtainable from Whitall Tatum Company, Philadelphia, Pa.

Experiment II.

It was planned in this case to utilize a less vigorously fermenting organism, namely a member of the *Mucosus capsulatus* group recently isolated from a case of chronic sinusitus. Dilutions of a 24-hour dextrose broth culture were made in sterile 0.85 per cent. NaCl such that 1 cc. contained respectively 1–10,000, 1–1,000,000, and 1–100,000,000 of the original culture. Ten tubes of each combination as well as an agar plate for each dilution were inoculated by the addition of 1 cc. from a pipette. The result of this test shows a larger amount of gas in more tubes in the case of the diagonal vial and this difference is most marked in the higher dilutions and upon the first reading. In the case of heavier inoculation and longer incubation the differences tend to decrease.

TABLE III.

NUMBER OF TUBES AND PERCENTAGE OF GAS FORMED BY B. MUCOSUS CAPSULATUS IN DIAGONAL AND SQUARE DURHAM VIALS.

Dilution.	Square vial.		Diagonal vial.		Agar plate.
	Inc. 37° C. 24 hours	48.	24.	48.	24.
1–10,000	10% 5 tubes 25% 4 tubes 50% 1 tube	50% 4 tubes 60% 2 tubes 80% 2 tubes 100% 2 tubes	25% 10 tubes	30% 1 tube 50% 6 tubes 80% 3 tubes	Uncountable
1–1,000,000	5% 5 tubes 10% 3 tubes 20% 2 tubes	50% 4 tubes 60% 3 tubes 80% 2 tubes 100% 1 tube	25% 7 tubes 35% 3 tubes	50% 4 tubes 60% 3 tubes 80% 2 tubes 100% 1 tube	Uncountable
1–100,000,000	Trace 5 tubes 1% 3 tubes 5% 2 tubes	40% 2 tubes 50% 5 tubes 60% 3 tubes 90% 1 tube	5% 4 tubes 10% 2 tubes 20% 4 tubes	50% 1 tube 60% 2 tubes 80% 4 tubes 100% 3 tubes	58 Colonies

Simultaneous examination of the *B. coli communior* of Experiment I and the *B. mucosus capsulatus* showed the former to be highly motile whereas the latter is non-motile. To this property is due I believe the better differentiation shown by the latter organism.

Experiment III.

In view of these observations it was now necessary to compare the diagonal vial with the Smith fermentation tube. A 24-hour culture of *B. muco-*

sus capsulatus was diluted with sterile 0.85 per cent. NaCl so that 1 cc. contained 1–100,000,000 of the culture and from this 10 diagonal vial tubes and 10 Smith fermentation tubes were planted by the addition of 1 cc. of diluted culture. An agar plate was similarly seeded. The result shows the advantage to again lie with the diagonal vial. This was not anticipated but is probably due to the slightly constricted throat of the Smith tube. It may be noted here that Smith (1) lays especial emphasis upon the necessity of this constriction from the standpoint of perfect anærobiosis.

TABLE IV.

NUMBER OF TUBES AND PERCENTAGE OF GAS FORMED BY B. MUCOSUS CAPSULATUS IN DIAGONAL DURHAM VIALS AND SMITH FERMENTATION TUBES.

Dilution.	Smith tube.		Diagonal vial.		Agar plate.	
	Inc. 37° 40 hours.	65.	40.	65.	40.	65.
1–1,000,000,000	10% 4 tubes 25% 5 tubes 40% 1 tube	10% 4 tubes 25% 5 tubes 40% 1 tube	20% 1 tube 30% 1 tube 50% 8 tubes	30% 1 tube 50% 5 tubes 60% 2 tubes 70% 2 tubes	196 colonies	——

At 40 hours the absolute amount of gas was approximately the same in both types of tubes. The Smith tube used is longer, the closed arm having approximately 2½ times the capacity of the Durham vial.

I desire to thank Miss Emma Staples and Miss Vera Bennett for their coöperation in this study.

Conclusions.

A diagonally-cut vial is preferable in the combination of test tube and vial known as the Durham fermentation tube because, particularly in the case of non-motile bacteria, the amount of gas collected is greater, it appears earlier, and in a larger number of tubes than in either the square vial or the Smith fermentation tube. These factors are of importance especially in presumptive tests where oftentimes small numbers of gas-forming bacteria are implanted and where early readings are to be desired. They are of less importance in identification of pure cultures where larger numbers of organisms are implanted.

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A COMPARISON BETWEEN THE TWENTY-DEGREE AND THE THIRTY-SEVEN DEGREE PLATE COUNTS FOR ENUMERATING BACTERIA IN WATER.

J. Bosley Thomas and Edgar A. Sandman,
Baltimore, Md.

The widespread objection to the change from the standard temperature of 20°C., for incubating plates for bacterial counts, to 37°C. has led us to run our routine counts at both temperatures for a time and contribute the results, along with those of other workers, who no doubt have been making similar comparisons, to a much-needed consideration of the matter.

To immediately discard the 20° count in favor of the higher temperature for all classes of work, without extended comparisons between the results obtained at both temperatures, or between bacterial counts at the 37° temperature and some other index of the quality of the waters examined, such as the routine isolation of the members of the B. coli group, would be much like returning to the time when the plate count was first brought into use.

Without going into a detailed consideration of the comparative conveniences of the two methods for all classes of work, as this has been so ably discussed before this section and recently in several published articles, notable among which is the paper by Professor Whipple, it may be well to briefly mention some points of our experience so far as the work of the comparisons has progressed.

We at first used the standard medium containing one per cent. of agar, but found that even the drying of the agar before making up a lot of medium did not entirely prevent the spreading of some colonies in the plates grown at 20°, although earthenware tops were used. The use of earthenware tops for the 37° plates was impossible, as the agar became almost entirely dried before counting could be done. The use of one and one-half per cent. agar and earthenware tops for the lower temperature plates gave excellent results. The same agar was used for the 37° plates, which were covered with glass tops and inverted.

For the purpose of this paper the results of daily examinations of samples of water from three moderately polluted streams, flowing through essentially the same kind of rural districts, and discharging from ten million to one hundred million gallons per day, were selected.

The average of the 37° temperature counts is 322; and the average of the 20° counts is 2,867, which is about ten times the 37° average. Several

methods of grouping the results were considered, but the following scheme of comparing the counts with the probable character of the water, and yet keeping the table as condensed as possible, was decided upon: Each sample having been subjected to examinations in pure culture for members of the B. coli group, the counts at both temperatures were grouped according to whether the sample had shown the presence of one or more members of the B. coli group in .01, 0.1, 1, or 10 cc., and further separated into the number of times they came within certain limits. The tests for members of the B. coli group included the use of dulcit, in addition to the three usual sugars, appearance of growth on gelatin, and other special tests after rejuvenation when the original results were not sufficiently characteristic.

TABLE SHOWING A COMPARISON BETWEEN THE 20° AND THE 37° PLATE COUNTS IN RELATION TO ISOLATIONS OF B. COLI ORGANISMS.

	B. coli group in .01 cc.		B. coli group in 0.1 cc.		B. coli group in 1.0 cc.		B. coli group in 10 cc.	
	37°	20°	37°	20°	37°	20°	37°	20°
Number of tests	9	9	50	50	70	70	60	60
Averages	2,700	20,000	390	5,500	170	2,700	85	1,300
Number of counts between								
1 and 50			5		8		24	
50 and 100			9		18	1	24	2
100 and 200			9	2	24	2	4	7
200 and 300	1		10	3	10	7	4	10
300 and 500	1		5	3	6	9	4	8
500 and 1,000	2		6	10	4	20		11
1,000 and 2,000	1		4	14		10		11
2,000 and 3,000			2	3		4		3
3,000 and 5,000	1	2		4		5		4
5,000 and 10,000	2	1		6		8		4
10,000 and 20,000		2		2		3		
20,000 and 50,000		3		3		1		
50,000 and 100,000		1						

Baltimore City Water Department.

A striking fact brought out by this method of grouping is that the averages at both temperatures increase in geometric progression as the B. coli group organisms were isolated from 10, 1 and 0.1 cc. This does not hold good, however, with the counts grouped under, "B. coli present in .01 cc.," where the small number of counts probably materially influences the average. A larger number of counts quite naturally fall below the

average than above it, as a very few high counts materially increase the average; but if there be any advantage of one count over the other as an index of pollution, it is perhaps slightly in favor of the higher temperature, the counts at which show less variation within the limits of the counts.

The use of the two temperatures for examining waters disinfected with calcium hypochlorite has shown that the organisms growing at 37° are more resistive to the treatment than those growing at the lower temperature, and that the higher temperature seldom shows the presence of aftergrowths, these aftergrowths usually consisting of those organisms, thriving best at a lower temperature, that have escaped the treatment.

A decision of which temperature should be adopted, or whether the lower temperature should be used for certain kinds of work and the higher temperature for certain other kinds of work, may well be postponed until sufficient comparisons have been made.

The Health Department Nurse.

Where the cooling breezes never seem to come,
Where the summer heat is throbbing out its curse,
Where the stench of human hiving marks the slum,
There is where you'll find the Health Department Nurse.

Where the garbage-littered alleys ooze and smell,
Where the old-faced children swarm the narrow street,
Where is found the human dump, a living hell,
Where they're slaving on but half enough to eat.

Where the summer death-rate claims its highest toll,
Where every sixth or seventh baby dies,
Where the slattern mothers count the mournful roll
That is yearly called to fever, filth and flies.

Here—where public greed and ignorance play a part
To the pulling of the politician's strings,
Does the Health Nurse find her work and break her heart
With the aching of the gladness that she brings.

Here, in spotless white, amid disease and grime,
Is she carrying the gospel of the clean,
And a ray of dawning health will mark the time,
For they're hungry for the chance that they have seen.

To the mother in the grip of labor pain,
To the baby with the heritage of sin,
To the cankered heirs of this our public stain,
Does the Health Nurse bear the slogan that shall win.

To the suffering and needy and distressed
Is she giving without stint her love and care;
And, wherever she is known, her name is blessed,
And wherever she is needed, she is there.

So we'll doff our caps and help her when we can,
As she goes about among the sick—and worse,
For she's doing what can not be done by man,
She's a woman—and the Health Department Nurse.

American Journal of Public Health

Official Organ of the American Public Health Association
Published Monthly by the American Public Health Association.

VOLUME IV.—Old Series Vol. X. DECEMBER, 1914. Number 12

$3.00 a year. 30 cents a copy.

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SIGNIFICANCE OF JACKSONVILLE MEETING.

It was practically the unanimous sentiment of those who attended the meeting of the American Public Health Association in Jacksonville the first week of December that it awakened in the Association a new consciousness. With this new consciousness came also a realization of the Association's opportunities, of its position in the public health field, of the importance, nay, even the duty, of making the most of that position. In his presidential address Dr. William C. Woodward pointed out that position. After urging the necessity of consolidating public health organizations of a national scope or at least—as a first step—coördinating their activities and pointing out that there are lack of efficiency and over-lapping of coördination, Dr. Woodward said:

"If a maximum of efficiency can be obtained only through the consolidation of our public health agencies into a single association or society, we must bend our efforts toward that end. Self-interest must be laid aside and each must loyally lend his best endeavor. That the end will be accomplished without disappointment and heart burnings no one can hope, but no matter what others may do the American Public Health Association must choose the path that leads to the maximum of effectiveness and adhere to it."

Thus was sounded the key-note of the convention. Sounding key-notes has been the time-honored function of conventions. Key-notes are all

very well in their way but most of them are merely sound, and, furthermore, sound that does not carry far from the platform on which it originates. The Jacksonville convention, however, did more than sound a key-note. It began to sing a new song.

The way to Tipperary is probably no longer than the path which President Woodward pointed out but there were many evidences in the Jacksonville meeting to indicate that the Association is at least about to get on that path, if, indeed, it is not already there.

Chief among these evidences is the resolution which the convention adopted unanimously, providing for a committee to arrange for a public health congress in 1916. Efforts will be made by this committee to bring about, at the same place and during the same week or two weeks in 1916, the annual meetings of the most important national public health organizations.

Evidence that the Association realizes the necessity for militant field work as well as coördination was the resolution providing for a committee to investigate the drug evil in its legislative and publicity aspects. A large part of the efforts of this committee, as indicated by the resolution, will be an active campaign with the newspapers of the country to present to them, confidentially if necessary, the real, sinister significance of the patent medicine advertisements.

Even the selection of the new place of meeting, in New York State, was an indication of the new idea. One of the chief reasons for the selection of Rochester was that it was possible to hold the convention in conjunction with the New York State Sanitary Officers' conference. That conference will bring together nearly a thousand of the Empire State's health officers. It goes without saying that many of those who are not now members will at that meeting become members, but more important than this is the opportunity for displaying to the health forces of the nation the workings of New York State's new health law and department. The 1915 convention will be a clinic in public health legislation and administration. By the time the convention is held, New York State will have been working under its new law for a little more than two years. It will have been tried not only by the experience of the field workers but also will have passed through trials of two legislative sessions. The American Public Health Association will be fortunate indeed in seeing at first hand the results of this experience.

The 1915 convention will therefore furnish not only an object lesson in coöperation but will provide material for an active propaganda in modern public health legislation. Machinery for such propaganda, in coöperation with the Federal Health Service and State and local health forces, is one of the greatest needs in the national public health field today. Active, general public health field work, similar to the effective field work of the National Tuberculosis Association, is prominent among the milestones of progress on that new path that President Woodward pointed out.

Southern newspaper comment indicates that the Jacksonville meeting stimulated in the South a new interest in public health. Certainly the exhibit gathered together from the leading Southern cities and nearly all of the Southern states, brought to the Association a new appreciation of the South's health problems and their many complications. The most important result, however, of the memorable 1914 convention was the new consciousness of power and opportunity which it stirred in the Association.

SUPERVISION OF COMMUNICABLE DISEASES IN THE SMALLER MUNICIPALITIES.

H. W. Hill, M. B., M. D. D. P. H.,
Executive Secretary; Minnesota Public Health Association.

Read at the Mankato Meeting of the League of Minnesota Municipalities, October 21, 1914.

The Public Health work of today is very different in character from that of twenty or even ten years ago in both big places and in small.

Then our conception of a public health department, especially in the smaller places, was a medical man who would casually put up and casually take down placards when infectious diseases were more or less accidentally reported to him; and one or more worn-out old men who helped the health officer in this onerous task, burned a little sulphur or boiled a little formaldehyde in the room where the patient was supposed to have been confined, occasionally rebuked some householder for an untidy back yard, a garbage heap, or cess-pool, and in general wandered about the community in a more or less desultory way urging people of the less wealthy residential districts to clean up. Most citizens looked upon the health department as a harmless, necessary evil, to be "Sicced on" to neighbors at times when the neighbors made any unusual contribution to the general odors of the vicinity and to be resented by themselves with conscious dignity and hurt pride whenever the inspector turned his thoughts their way. "My well is the best well in the township; but my neighbor's well—I don't see how those people drink it—my back yard is all right—but it's a wonder my neighbor's back yard does not breed a pestilence—"

Everyone shuffled along very comfortably, was born, had all the regulation three and one-half children infectious diseases per head before he was twenty-one, passed on to maturity, contracted such adult diseases as were open to him to contract, grew old, and died with a pleasant if hazy impression that his community was the healthiest in the state, that he was entitled to pity people who had to live under a less well regulated public health régime, and that, all things considered the health department did very well in view of the fact that they really had not much to do anyway in such a healthy community.

That the operations of such health departments accomplished nothing in the prevention of disease and death, that they made many unnecessary ordinances, imposed many wholly needless burdens and caused many a wholly useless clean-up, that they were helpless in the presence of an epidemic and absolutely futile to stem even the usual current of disease never seems to have entered anybody's head.

But we have reached an age where we do not take for granted that a thing is good simply because it is long established. We require every

body and every thing to show some reason for existence, some result obtained for time and money expended. We want to know—and we want to be shown.

This investigative turn of the public mind into established procedures revealed some curious things concerning the old style health department; such as that despite the alleged health department activities, disease was just as prevalent in communities with such health departments as in those without; that in brief, whatever functions a health department exercised they were not functions which had any marked effect in disease and death.

The present conception of a modern health department is a body of highly trained people who really know all about the diseases they exist to prevent; who really know how to prevent them; and who really have the necessary facilities to really accomplish prevention.

We no longer believe in a promiscuous way the old-wives fables that specific diseases of definite and now well-known origin can develop from bad smells or decomposing vegetable or animal matter. We do not attribute every disease to sewer gas or swampy land. We recognize that of all the diseases man is heir to, the ones which we can prevent are all contracted by more or less direct contact with previous cases; and the modern health department is intent on knowing and supervising every case until it can no longer spread the disease.

Also we have at last recognized the apparently only too obvious fact, nevertheless long overlooked, that it is not the severe case of diphtheria or scarlet fever, tuberculosis or smallpox that chiefly spreads infection, for the severe case is sick in bed as a rule and comes in contact almost solely with the doctor and the nurse. It is, we see now clearly, the mild, the unrecognized and too often the deliberately concealed case, the case not sick enough to go to bed, not sick enough even to call a doctor, that runs about the community at large and disseminates infection to all corners.

The modern health department which contents itself with placarding severe cases during the height of the disease is a futile and practically useless municipal department, unjust in that it penalizes the honest citizen who allows his doctor to report the case, while his neighbors' children with the same disease escape; futile, because for the one case thus isolated, a dozen are often running free and uncontrolled.

The supervision of infectious diseases is today a scientific, strenuous occupation in which the conscientious and well-posted health officer finds use for all his medical training, a large share of detective ability, infinite patience and tact, and above all a firm jaw and a stiff backbone.

One such man to every 20,000 of the population would have a marvelous effect in a very short time in Minnesota for he would really do what most local health departments now only go through the form of doing—he would trace infection mild, unrecognized and concealed through its many ramifi-

cations and he would really prevent further spread instead of accomplishing almost nothing.

The small municipality cannot afford such a man; even the large ones in Minnesota still have only part-time health officers with departments underpaid, under-manned, unprovided with proper facilities.

Every municipality of twenty thousand inhabitants or more should have one whole-time health officer devoting himself not to municipal housekeeping, cleaning streets or collecting garbage, but to the prevention of disease and death. Of course, garbage collection, street cleaning, etc., are important municipal enterprises, but they are matters calling for administrative business ability, not the technical training of a medical man in the origin and methods of spread of contagion. Through what form of imbecility were our forefathers led to believe that the ability to distinguish typhoid fever from typhus fever, training in the use of the microscope or knowledge of the period during which scarlet fever is infectious were prerequisites to organizing a gang of scavengers to make reasonably good time from the householders' garbage can to the city dump? Nuisances also must be regulated and abated; but these are pure police duties. An intimate knowledge of human anatomy, physiology, and pathology is not a prerequisite to finding out whether or not the smell from a rendering plant causes complaint amongst the neighbors. Poorest of economies is it to use teaspoons for driving nails. Why train a man at great expense over long years to do one thing well and then set him to do badly something he has never learned? The whole-time health officer should therefore have no such occupations to distract him. Communities of less than 20,000 may be united to provide among themselves a-similar official.

This conception of health department work is growing everywhere, but the tendency is to hand this work over to the state, because of the difficulties the smaller communities would have in getting together satisfactorily on a choice. In New York, Maryland, Wisconsin, in this country, in Ontario and Quebec across the line, the state government has a number of such experts each with his own district to look out for; not replacing the local health officer, but helping him, doing the things he now leaves undone, following up mild, unrecognized and concealed cases as he cannot or will not do.

This we hope to see in Minnesota. We are asking for twenty such men in our eighty-four counties outside Ramsey and Hennepin. The Federal government expert who recently investigated Minnesota Health work has strongly recommended this plan in his official report and we hope to find you gentlemen convinced and strong supporters of it.

Please remember that the whole meat of health department is in *doing* it; and no amount of regulation, advice or wisdom recorded in your ordinance amounts to preventing a single case, even of chickenpox, unless it is *done*, not merely talked about or written.

THE QUEQUECHAN RIVER IMPROVEMENT, FALL RIVER.

A MILLION DOLLAR PROJECT IN MUNICIPAL HOUSEKEEPING.

FREDERIC H. FAY,* C. E.

Read before the Massachusetts Association of Boards of Health, October 29, 1914.

In the Quequechan River situation Fall River is confronted with a problem which vitally affects the health and the industrial welfare of the city. Before undertaking to describe conditions in detail a brief general view of the city and its surroundings as well as a dip into history are desirable in order that the situation may be more clearly understood.

FALL RIVER'S ADVANTAGEOUS LOCATION.

From the standpoint of natural advantages, Fall River's location is particularly favorable for the development of a large industrial center. The city lies at the mouth of the Taunton River bordering on Mount Hope Bay, a tributary of Narragansett Bay, and its excellent harbor is accessible to ocean-going vessels of deep draught, making it possible to bring cargoes of coal and raw materials by water directly to the city's water front.

To the east of the city and close at hand lie the Watuppa Ponds, large and beautiful lakes, which furnish the water necessary for domestic and manufacturing purposes. Few cities are favored with such natural advantages as these.

WATUPPA PONDS AND TRIBUTARIES.

The Watuppa Ponds, originally one large lake but of late years separated into two by the building of a causeway at the Narrows, are together the largest body of fresh water in Massachusetts. The total length of the two ponds is about eight miles; the maximum width, at the South Pond, is approximately one and one-half miles; and their combined area is five and one-quarter square miles. Tributary to the South Pond are three smaller ponds, Stafford, Sawdy and Devol, having a combined area of one and one-half square miles. The total area of the watershed draining into the Watuppa Ponds is twenty-seven and one-half square miles, of which six and three-quarters square miles, or about twenty per cent., is pond area, an unusually large proportion of water surface to drainage area.

The total storage capacity at full pond level of the two Watuppa Ponds is over fifteen billion gallons, and that of the three tributary ponds to the South is nearly four billion gallons. Of course, by no means all of this storage is available, but by the improvements now contemplated nearly forty per cent., or over seven billion gallons, can be utilized.

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Attention should be called to the fact that the Watuppa Ponds watershed lies not only in three Massachusetts towns, Fall River, Dartmouth and Westport, but also partly in the state of Rhode Island, Stafford Pond and its drainage area being wholly within the town of Tiverton. The fact that two states are involved adds difficulty to the problems of the conservation and sanitation of these waters. The elevation of the two Watuppa Ponds is about one hundred and thirty feet above sea level.

Quequechan River—Early History.

The outlet of the Watuppa Ponds is the Quequechan River, which leaves the South Watuppa Pond at the sand bar and flows on almost a level course through the heart of the city for nearly two miles to a point near the City Hall. It then falls rapidly the last half mile of its course, having a drop of nearly one hundred and thirty feet, emptying into the tide waters of Mount Hope Bay.

The name Quequechan in Indian language means "falling water"; and from it the name of the city has been derived. From the time the whites first settled Fall River the value of the mill privileges at the successive falls along the lower half mile of the river was recognized, and mills were early located here.

Originally the Quequechan was a narrow stream for its whole length, the width between the banks averaging perhaps a hundred feet.

In 1826, the use of the water for power purposes had become so extensive that the mills on the stream saw the need of securing more power by additional storage in the Watuppa Ponds, and the Watuppa Reservoir Company, an association of the several mills, was organized and incorporated by an act of the legislature, its purpose being to control the waters of the stream, and to build a dam above the upper fall which should raise the level of the water in the Watuppa Ponds, and the upper portion of the Quequechan about five feet. This work was carried out, and the raising of the water level resulted in the overflow of the banks of the stream for a considerable distance, the Reservoir Company shrewdly securing flowage rights, if only by the payment of nominal sums, on all of the overflowed lands on the banks of the stream and the shores of the ponds. By the construction of this Watuppa Dam about two hundred acres of the banks of the upper Quequechan were overflowed and transformed into shallow flats. From 1826 to the present time the control of the waters of the Watuppa Ponds and the Quequechan has remained in private hands, those of the few mills on the lower portion of the river which together constitute the Watuppa Reservoir Company.

With the introduction of steam power, the conditions at Fall River were radically changed. Where formerly mills were dependent upon the power derived from water-wheels, and could therefore be located only at the falls on the lower portion of the stream, new mills were now built along the

shores of the upper portion of the river, from which they could obtain an abundant supply of water for boiler feed and other mill purposes. In some cases these mills wished to encroach upon the overflowed flats, in order to secure advantageous mill sites, while the Reservoir Company desired to use all of the flats for the storage of water. The result was that the Reservoir Company established definite channel lines, to which the owners of the shore property would be allowed to fill upon payment to the Reservoir Company of a stiff price for the area filled, as damage to that company for the loss of its flowage rights. Under this arrangement a small proportion of the area of flats has been filled.

City Water Supply.

By 1870 the city felt the need of a system of water supply and naturally turned to the Watuppa Ponds. It secured the passage of an act by the legislature, in 1871, which authorized the city to take water for domestic purposes from the North Pond; but the prior right to the use of the waters of these ponds by the Watuppa Reservoir Company under its charter of 1826 being recognized, the act of 1871 stipulated that not only should the city be liable for the payment of damages for the taking of the water, but further that (within certain extreme limits of pond level) the city could not maintain the level of the water in the North Pond more than one inch above the level of the water in the South Pond. The practical effect of this regulation is that the private corporation, the Reservoir Company, can draw down the South Pond at will, and the city, no matter how badly it needs the water of the North Pond for its domestic supply, is compelled to make good this withdrawal by transferring water from the North Pond to the South Pond until the difference in level of the two ponds does not exceed one inch. So far as regulation of the North Pond storage is concerned, the city is at the mercy and caprice of a private corporation. Furthermore, this private corporation is paid for the loss of the water which the city uses for domestic purposes, an agreement having been reached after long controversy by which this payment is effected by the abatement by the city of the taxes assessed on the value of the water privileges of the lower Quequechan for power purposes.

In the matter of its water supply, then, Fall River is in a unique position, for not only does it not own its source of supply, but it has no power to regulate the conservation of its water, and furthermore, must pay tribute to a private corporation for the privilege of taking water for municipal purposes.

Quequechan River—Recent Conditions.

During the last forty or fifty years there has been a considerable increase in the number of mills on the upper portion of the Quequechan, and with the introduction of condensing engines large quantities of water were needed by these mills for cooling their condensers, in addition to that

required for boiler feed, and for bleaching, dyeing and sanitary purposes. The use of the water has now become so extensive that the interests of all parties demand careful conservation of all waters available for industrial purposes; but, notwithstanding this fact, the Reservoir Company, the association of mill owners on the lower portion of the stream has proceeded to the present time with little coöperation with the large number of mills on the upper river.

For example, one would think that naturally the waters of the ponds tributary to the South Pond would be stored, so far as possible, in wet

Settling basin receiving waste condenser water from several mills. Crude sewage is also discharged into this basin. Note the boys bathing in this polluted water.

seasons, to make up deficiency during dry seasons, but such is not the case. The Troy Mill and others, it is understood, on the lower portion of the stream, use the water for power purposes (for the turning of water-wheels) when the level of the South Pond is not more than one foot below full pond level, this height of pond being reached almost every year during the spring freshets. It being to the interest of the mills constituting the Reservoir Company to prolong the period when water may thus be used for power purposes, Sawdy and Devol Ponds are naturally drawn down in the late spring, just as soon as the level of the South Pond approaches one foot below full pond level, with the result that, during the summer and fall when water is most needed by mills on the upper river, Sawdy and Devol Ponds have been already drawn down to their minimum level and can contribute nothing toward the flow of the Quequechan.

As the result of the lack of a broad policy of conservation and regulation of the use of the water, there is a period each year when the river is drawn down so low that it seriously handicaps the manufacturing interests and creates in the otherwise attractive stream a most unsanitary condition of affairs—a nuisance of an aggravated sort in the very heart of a city of 125,000 population. The nuisance is the more aggravated from the fact that the river is the natural means of draining a considerable area of the city, a portion of which is still unprovided with sewers.

FORMATION OF THE WATUPPA PONDS AND QUEQUECHAN RIVER COMMISSION.

While Fall River people generally have not as yet become thoroughly aroused to the need of improving conditions along the Quequechan River, those most conversant with the situation are keenly alive to the potential menace of the stream and the necessity for conservation of the water to permit future increase in the number of mills. The health of the community as well as the future industrial growth of Fall River demand that something be done.

The matter was brought officially to the attention of the citizens in 1910 by a report on the Quequechan River issued by the city's Reservoir Commission, the official body charged with the duty of protecting the purity of the water supply; it being found that measures proposed for the protection of the North Watuppa Pond would affect also the South Pond and the river. Fortunately the matter was not allowed to drop and in 1913 the legislature passed an act which permits the whole situation to be handled in the most comprehensive manner.

Under this act there has been created a board of five commissioners, appointed by the Mayor of Fall River, and confirmed by the Board of Aldermen, known as the Watuppa Ponds and Quequechan River Commission, which is charged with the duty of making "a careful investigation of the whole subject of the nuisances in and along the line of the Quequechan River or upon or about lands or flats or waters adjacent or near to said river, and of the needs of the city for the increase, purification, protection and control of its water supply and the conservation and improvement of the waters of the Watuppa Ponds and of all brooks, streams and water sources contributing thereto." The commission is further directed "to make necessary surveys and examinations and prepare and submit to the state board of health for its approval, comprehensive plans, showing in detail full and complete methods for the abatement of the nuisances aforesaid, for the control and direction of the waters of the Quequechan River, for proper drains for surface water and sewers for sewage, and for the increase, purification, protection and control of the water supply of the city."

As the work progresses, the commission will give public hearings upon its plans to all parties interested or affected, and after the project has received the approval of the state board of health, a full report covering

the whole planning is to be presented to the Fall River City Council, which body will determine whether the scheme is to be carried out.

Sanitary Survey of the Quequechan River.

The Watuppa Ponds and Quequechan River Commission has instituted an investigation of the nuisances in and along the line of the Quequechan River. To any one who visits the river at periods of low water, it is strikingly apparent that the sanitary condition of this stream is one which should not be tolerated in the heart of any city.

The pollution of the stream is mainly due to the fact that over two square miles of the area tributary to the river, either directly or by drainage into the South Pond, are not provided with sewers of any sort. Within this unsewered area are located numerous industrial plants with a considerable residential population, and as the future growth of the city must inevitably be largely upon portions of this area now vacant, conditions will rapidly grow worse unless definite action is taken.

Sources of Pollution Above Watuppa Dam.—The chief sources of pollution of the stream are the manufacturing establishments which have no sewer connection, and from which sewage and mill wastes find their way into the river. At least sixteen specific instances of extensive sewage pollution from mills, or other manufacturing establishments are known. From two or more mills employing over a thousand operatives crude sewage is found discharging directly into the Quequechan along with the waste from the condensers. In the case of fourteen mills employing some six thousand operatives, cesspools are provided to receive the mills' sewage, but these cesspools overflow into the river. The sanitary survey of the stream disclosed the fact that at several of the mills and at other places there are privies discharging directly into the stream.

In five cases there are storm sewers emptying into the river which not only take the surface drainage, with whatever surface pollution there may be, but which, also, in at least three cases receive the overflow from sanitary sewers. These sewers are at Plymouth Avenue on the north and south sides of the river; at Lowell Street on the south side of the river (where a large storm sewer just built is about to be put into service); and at Quequechan Street and at Choate Street on the north side of the river.

Of the miscellaneous sources of pollution, the principal ones are the discharge of dye or bleachery wastes from the mills. At the Stevens Manufacturing Company, bleachery wastes, as well as sewage are discharged into the settling pond which overflows into the river. At the Barnaby Manufacturing Company's mill dye wastes are discharged into a double cesspool which drains into the river. At the Massasoit Mill dye wastes are discharged directly into the river.

Notwithstanding the extensive pollution of the stream, the Quequechan River is largely used in the summer months as a bathing place.

The Quequechan Flats.—It has already been stated that the original width of the Quequechan River was about one hundred feet, but that by the building of the Watuppa Dam, the banks of the stream for nearly two miles in length were overflowed until about two hundred acres were covered by shallow flowage at times of high water. A portion of these flats have been filled in, but there still remain over one hundred and sixty acres outside of the original river bed which are overflowed during the wet season of each year, and which are either uncovered entirely, or flowed only to a

Low water view of Quequechan River looking down stream from Quequechan Street Bridge, showing exposed flats covered with sediment of silt, sewage and mill wastes.

depth of a few inches during the dry months. The flats are covered with a sediment consisting of a mixture of silt, sewage and mill wastes. When covered by water, gases are seen rising to the surface denoting chemical activity which is taking place in this sludge; when uncovered, these flats are offensive both to the eye and to the nose. At many places along the stream vegetation is abundant and the flats approach the conditions of a swamp, while the banks at several places have been used as dumping places for various kinds of city refuse.

The Quequechan River Below the Watuppa Dam.—Below the Watuppa Dam, the river flows beneath streets and numerous buildings, and is exposed to view for only small portions of its length. Its general direction is through the Troy Mill yard crossing underneath Third and Second Streets, running beside the City Hall and beneath South Main Street, and then falling

through a succession of falls, parallel to Pocasset Street, the natural outlet being into Mount Hope Bay at Central Street, a short distance north of the Fall River Line wharf. Except at flood times the entire flow of the stream is diverted into Crab Pond, however, from which water is taken for the use of the American Printing Company.

Because this portion of the stream is covered up for the greater part of its length, few people have any knowledge or conception of its condition. An examination of the river when the water is shut off at the Watuppa Dam, and the lower river bed is exposed, shows that for a considerable part of its length the stream is filled, often to a depth of several feet, with the accumulated silt, sewage and other filth of many years. The depth of the sludge at many places, to say nothing of the odors arising when it is uncovered, make it impossible for a human being to traverse the length of this portion of the river. Description is not easy, and one should see for himself to realize the extremely filthy condition of the river existing in the covered recesses beneath the streets, business blocks and mills in the very center of Fall River's business district.

The Problem Before the Watuppa Ponds and Quequechan River Commission.

So far we have discussed mainly the sanitary condition of the Quequechan, and this is perhaps of chief importance as it bears directly upon the health of the inhabitants of Fall River. Considering that the river carries the sewage from thousands of mill operatives, that the stream is used freely for bathing purposes, and that this polluted water is employed for various industrial uses in the mills, it is perhaps remarkable, and certainly fortunate, that the city has escaped serious epidemics, for surely the conditions are favorable for spreading disease.

The sanitary question however is but one of the many sides of the problem confronting the Watuppa Ponds and Quequechan River Commission. Next in importance is the supply of an adequate quantity of clean, cool water to the mills of the upper portion of the stream. At present these mills require from 25,000,000 to 30,000,000 gallons of water daily for condenser purposes, while in a dry season the flow of the river may fall as low as 5,000,000 or 6,000,000 gallons per day. These mills, then, have to use the water over and over again and as the water discharged from the condensers comes out at a high temperature and more or less polluted with oil, the temperature of the river water is raised at times to considerably more than 100 degrees F., resulting in a loss of efficiency in the condensers and the burning of more coal; and, further, the water of the stream is coated with a film of oil. In dry times, too, the mills below the Watuppa Dam suffer for lack of a sufficient quantity of water; and if, by proper regulation of the flow, from 15,000,000 to 20,000,000 gallons can be

supplied to these lower mills every working day in the year instead of the present minimum amount of 5,000,000 or 6,000,000 gallons, they will also receive considerable benefit.

View of shore of river alongside Plymouth Avenue showing growth of vegetation and semi-stagnant condition of water.

Then there is the problem of rail connections to the upper mills. Although the Fall River and New Bedford Branch of the New York, New Haven and Hartford Railroad runs the whole length of the upper Quequechan as far as Plymouth Avenue, but two or three of the many mills are provided with sidings, presumably mainly because of the expense of building and maintaining trestles across the flats, and the freight at present is teamed. In any scheme for the improvement of the river, attention should be paid to providing adequate railroad sidings to the mills.

Incidental to the railroad problem, also, is the question of the present or future elimination of grade crossings at Quequechan Street and in the vicinity of Plymouth Avenue, while under the head of transportation is to be considered the possibility of the building of one or more new streets in this valley.

The Commission is charged further with the duty of making an investigation of the Watuppa Ponds' watershed, not only to determine the best means of conserving the waters of these ponds and their tributaries for industrial purposes, but also to study the needs of the city for the increase, protection, purification and control of its water supply which is now taken from the North Watuppa Pond.

Lastly, but by no means least, the Commission is directed to plan comprehensive systems of sewers for the two square miles of territory tributary to the Quequechan which is now unsewered; these sewers to be on separate systems, sanitary sewers taking the sewage to tide water in Mount Hope Bay and storm sewers to take the surface water to the South Pond that every drop may be conserved for industrial uses. In addition, sanitary sewers are to be provided for an unsewered district on the west shore of the North Pond. These sewers will vastly improve the sanitary condition of the heart of Fall River and without them no adequate solution of the problem of the nuisances along the Quequechan could be found.

Truly the problem is many sided and rarely does a community have one more complex or more diversified.

The Remedy.

Several schemes of sanitation and conservation have been suggested, but the best solution of the problem appears to be, in general, along the lines here outlined. These provide for the construction of a cold water canal from the South Pond to the Watuppa Dam, with a dam at the pond outlet to conserve flood waters and regulate the flow. From this canal an abundant supply of cold water many be drawn by the upper mills while a steady and largely increased minimum flow of water will be allowed to pass down stream to supply the needs of the lower mills. The hot condenser water coming from the mills will not be allowed to enter the cold water canal, but instead will be returned to the South Pond by means of hot water return conduits in connection with which cooling ponds may be provided. The present unsightly and unsanitary flats are to be filled, thereby not only effecting an abatement of their nuisance but at the same time providing additional land areas which will be exceptionally valuable as sites for new mills and which will go far toward offsetting the cost of the improvement. Additional mill sites are needed if Fall River is to continue in its industrial growth.

In connection with the canal a street has been suggested, which would follow the canal from Pleasant Street, or from Plymouth Avenue, as far as Quequechan Street, and there branch off to connect with an extension of East Warren Street.

Fall River is by no means indifferent to the situation; on the contrary she is alive to the necessity for action, and is attacking her problem with vigor and in the most thorough way. The investigation has not yet proceeded far enough to enable the Commission's plans to be given in detail, but from this brief account some idea may be had of the magnitude of the task. It is easy to see that Fall River is confronted with a million dollar project in municipal housekeeping.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

The regular quarterly meeting of the Association was held at the Brunswick Hotel, in Boston, on Thursday, October 29, 1914.

The meeting was called to order by the President, Mr. James C. Coffey, of Worcester.

The following named persons were recommended for membership by the Executive Committee and were duly elected by vote:

Dr. Philip Castleman, Board of Health, Boston, Mass.
John A. Cook, Board of Health, Provincetown, Mass.
Fred S. Dodson, Board of Health, Wellesley, Mass.
Charles W. Eaton, Board of Health, Duxbury, Mass.
Dr. W. L. Eisner, Board of Health, Pittsfield, Mass.
Stephen H. Foley, 34 Union St., Attleboro, Mass.
Curtis M. Hilliard, 87 Middle St., Braintree, Mass.
Dr. F. M. Lowe, 1354 Washington St., Newton, Mass.
E. C. Morgan, Board of Health, Truro, Mass.
Dr. Ezekiel Pratt, 374 Massachusetts Ave., Arlington, Mass.
Dr. Edward S. Ward, 42 High St., North Attleboro, Mass.

The Executive Committee recommended the following named members for appointment as a Committee on Nominations and it was voted to so appoint them: Dr. E. H. Stevens, of Cambridge; Dr. C. V. Chapin, of Providence; and Dr. A. S. Macknight, of Fall River.

Dr. Geo. L. Tobey of Clinton, chairman of the Committee on Legislation, presented a letter from the Joint Special Committee on Legislative Procedure calling attention to a hearing on the 10th, 11th and 12th of November to persons interested in such changes in the rules of the general court and in the general law as will tend to expedite legislation, and will ensure better consideration of the same to avoid constant revision of the general law. It was voted to refer this matter to the Executive Committee.

Mr. Frederick H. Fay of Boston then read a paper entitled "Quequechan River Improvement," Fall River, Mass. (This paper appears elsewhere in this issue.)

QUESTION MEETING.

The President: I want to say that the rest of the programme today is an innovation in the history of this organization. It has been thought that by establishing one of our quarterly meetings as a question meeting in which perplexing problems that arise daily in every health officer's life might be brought here for discussion, some of the members may be able to throw light upon them and thereby aid the particular town in which

a question was found perplexing. So today we have a series of questions. They are rather numerous and lengthy and you will notice that a time limit has been fixed. Owing to the length of the programme it will probably be necessary to confine the members to the amount of time that is here designated—five minutes for the opening and three minutes for the discussion by each member speaking.

Question 1.

Should the results of milk analyses be given publicity? Discussion opened by G. E. Bolling of Brockton.

Mr. Bolling: In reply to the question "Should the results of milk analyses be given publicity?" I will say that such should be the case in general but with certain qualifications, however.

Let us assume that under the conditions that exist in this state—which are, of course, what we are most interested in—a local board of health is collecting samples from the wagons and stores of dealers and subjecting these samples to analysis. During the course of a year probably at least a dozen samples are collected from each dealer, the data from which when averaged should tend to show the average condition of that individual's product for the year. Some boards of health present these yearly averages in their annual reports from which any citizen who cares to can ascertain the rating of any particular dealer.

I believe this is one of the fairest ways of making public the result of such tests because those of us who have been sufficiently close to milk inspection work know that even in the best regulated dairies accidents are not unapt to happen. For example, not all hired help can be depended upon to exercise the same care in the handling of milk when not under the watchful eye of the owner or foreman as they do when under supervision. I have known a dairy to go ten months of one year with a bacteria count that averaged under 10,000 to the cubic centimeter, and then one day when the chief herdsman was called away by illness, a recent acquisition to the force of dairy hands milked a cow that was being kept apart from the herd on account of garget which resulted in a sample being collected from the wagon of that dairy the next morning that yielded a count of over a million to the cubic centimeter, chiefly the streptococci that were occasioning the disease in the infected animal.

Now, if in that city the custom obtained of advertising in a newspaper the results of each and every sample collected, many readers might have secured their sole information regarding that dairy from the one bad sample. Thus it must be apparent that from the indiscriminate advertising of all results cases will occur where dealers may be subjected to loss of trade,

and what is fully as much to a conscientious dairyman, loss or disturbance of his peace of mind.

In my opinion, the reputation of any dealer's or dairy's product should be given every possible consideration by the authorities and this applies to the results of chemical analyses as well as bacteriological examinations.

In Brockton we have had a bacterial standard of 500,000 per cubic centimeter for nearly nine years and from the very first have observed the ideas I have endeavored to convey. During that time it was deemed necessary to prosecute eight dealers because of persistent violation of the bacterial regulation, all cases resulting in convictions and payment of fines. Such prosecutions as well as those conducted for adulteration of milk by watering or skimming we found quite unnecessary to advertise as the local papers were quite willing to treat the matter as news.

What I have said applies to our city with a population of between 60,000 and 70,000 with some 102 wagon dealers and 270 store dealers licensed to sell milk. Whether these methods would suffice in a much larger city where nearly all the milk is supplied by a few contractors I am unable to say.

To answer the possible objection that yearly publication of records is insufficient I will add that the chief aim of securing for any community a milk supply with a low bacterial count is to render such supply a safe food for infants. In Brockton the Health Department mails immediately to every family in which a birth is reported a circular dealing with the care of the infant and the care of milk in the home and a request that the family consult with the Department regarding their choice of a milk dealer. This, we believe, employs a certain form of publicity exactly where it will achieve the best results.

S. H. Durgin, M. D., Millbrook, Mass.: This has been in years past one of the perplexing questions in all cities. Some years ago I consulted the Corporation Counsel of Boston, and he thought there was certain doubt about the authority of the Board of Health to advertise the results. I concluded I had better take his advice at rhat time. I hope the time is coming when the authority may not be doubtful, when this may be legally done. There is no doubt in my mind whatever that it is the best method by which people can get rid of unclean milk if they desire to. If these figures are published nobody can complain if they continue to take what they may properly call dirty milk. It does not seem to me, aside from the disease-bearing germs, that we should be particular whether people want to take dirty milk or not; I believe we might leave it with them to say. I can merely say for myself that I believe it to be the easiest, the fairest and the best method of treating the dirty milk question.

Mr. R. N. Hoyt, Coöperative Boards of Health, Wellesley, Mass.: As Milk Inspector for a group of towns in the vicinity of Wellesley, I am very much interested in this problem. Several towns with which I am connected have been publishing a monthly report in the local newspaper. They believe that the information given in the annual report is very ancient history, and that it is read by very few people. The methods of publication in our various towns have not been identical. In one town, the milk analyses for four preceding months

are averaged and published each month. In other towns, the individual analyses for the two or three preceding months are all printed in detail. The problem of securing the purification of certain mill wastes discharged into nearby rivers has been solved by making purification and the saving of profitable by-products. We believe that the milk problem is to be solved in a similar way. Publicity of milk analyses makes the sale of clean milk profitable. This method has the advantage of avoiding arbitrary and low standards. The Boston standard, limiting the bacteria count to 500,000 may be the best practicable for a large city, but it is not what any of us would deem to be satisfactory. A bacteria count of 400,000 is too high if we can secure something better. Publicity has a second advantage, acting as an incentive to the good milkman as well as to the dealer who sells very bad milk. By simply printing the results of the analyses, you induce them all to work for an ever better record.

I am very much interested in the legal aspects of the question and would be very glad if there are any lawyers here who have studied the legal aspects to have them present that feature of it. In one town, the milk dealer threatened to bring suit in case the milk analyses were published. The editor of the local paper was willing to take the risk as he thought he was doing a good thing for the town. The dealer did not bring suit.

Dr. Maloney, of Fall River Board of Health: I do not believe in the policy of publication of laboratory findings. They are very apt to be confusing and misleading. A pretty small fraction or percentage of the people would be able to read the laboratory findings intelligently. A majority of the people who would be benefited in clean milk do not read every newspaper. Laboratory findings are valuable only to officers of a well-regulated milk inspection system; outside of that they mean very little. Five hundred thousand of anything is an enormous sum to the lay mind, whether it be bacteria or dollars; to the average man it means about the same. The publication of a report which shows that a man's milk supply contains 200,000 bacteria per cc. this month, 500,000 next month, and 1,000,000 the next month, means absolutely nothing to the public. A very small percentage of the public would even read the statistics if they were published daily in the public press. Therefore I believe the problem of proper milk inspection is frequent, regular inspection of dairies and milk plants carrying with it information and instruction to the producer and dealer.

I believe it is wrong to say "A board of health has done its duty when it has published a report of conditions which it considers dirty or insanitary" and that "we are not interested whether they accept our reports or not."

I believe it is the function of a board of health to see to it that the public are protected against themselves. The mere publication of laboratory findings of milk examinations, which a large proportion of the public cannot understand, would be of no benefit, and therefore would not fullfil the function required of a board of health.

Dr. Rosenau, of Harrard Medical School: Mr. President, I believe in publicity but I also believe that the methods used in publishing should be carefully considered. The question at issue well illustrates the point. I don't believe that the milk problem can be solved by publishing the bacteriological results in detail, nor by publishing the chemical results in detail, nor by publishing the results of the sanitary conditions of the farm in detail. The important thing, to my mind, is to classify and grade all milk. We may well conform to the government classification into three grades, A, B, and C. Grade "A" milk is certified milk or its equivalent; Grade "B" milk is inspected milk, and Grade "C" milk is market milk. Now, everybody knows that A is better than B, and B is better than C. These grades are based upon the composite results of all that is known about the milk, including the results from the chemical laboratory, the bacteriological laboratory, and the sanitary inspection of the farm; also the conditions of transportation, the temperature, cleanliness, health of cattle, personnel, and all other factors. It is the sum total of all we know about the milk. If the barn is clean, the dairy methods good, the cattle tuberculin tested, the cans, pails, and bottles scalded, the milk chilled and kept cold and delivered while fresh, and if the personnel are free from com-

municable diseases, and, furthermore, if the milk has a low bacteriological count and proper and uniform chemical composition then we have Grade "A" milk. Grade "A" milk sells for from 16 to 20 cents a quart; Grade "B" milk for 12 cents a quart, and Grade "C" milk for from 8 to 10 cents a quart. The grading of milk greatly simplifies the problem. It helps the producer to get more money for a better quality of milk. It helps the consumer in being able to easily know what he is buying. Everybody understands a simple system of grading, whereas they have difficulty in interpreting the number of bacteria per cubic centimeter or the percentage of butter fat. Therefore, I think the results should be published not so much in detail but as a final summing up of qualities as indicated by Grades A, B, and C.

Mr. Howe, of Framingham Board of Health: I agree with what the last speaker has said about the Massachusetts statutory standard, but in Framingham we have a number of individual dealers who have small amounts of milk. I would like to ask how we could classify the milk so as to get our three grades. Could you ask an individual dairyman who is supplying say not more than 200 quarts to pasteurize it provided it did not fall into class A? Do you think the time is ripe in a town the size of Framingham, of 15,000 inhabitants, to inaugurate a scheme of that sort?

Dr. Maloney, of Fall River Board of Health: May I answer that question? We have just such a scheme in Fall River; we have our milk classified into A, B and C grades. The A grade consists of milk that conforms to all the requirements and regulations of the board of health plus its recommendation. Grade B milk is milk that conforms to all the requirements. Grade C milk is milk that does not conform to their requirements and recommendations and cannot be sold as raw milk, it must be sold as pasteurized milk. Here we have the same problem: Our milk supply is furnished by a number of small producers, they are required to conform to all the requirements, and if they meet the requirements, plus our recommendation, they are given the right to advertise that they are selling milk graded by the board of health as A.

Mr. Howe: May I ask if you had any difficulty in getting those small dealers into that list?

Dr. Maloney: We began that system about fourteen months ago and now we have about six men producing Grade A milk. Practically all of our men are producing Grade B milk; and as we have no pasteurizing plant in the city we have no Grade C milk.

Dr. Croston, of Haverhill Board of Health: Representing the city of Haverhill, we have been reporting our milk analyses for the last three years in the newspapers and we have had no legal difficulty whatever. We have not prosecuted a single man in that time but we have noted a gradual falling off in the bacteriological count and a gradual improvement. And we report that we not only favor the publicity but we think it is encouraging a spirit of emulation among the producers and for that reason we propose to follow this course.

Dr. Calvin G. Page, of Harrard Medical School: In confirming what Professor Rosenau fairly said I would like to call your attention to two reports from Geneva, N. Y., by the Agricultural Experiment Station, one for April, 1911, No. 337, and the other for April, 1913, No. 363. In that town they carried the point by means of the dairy scores published as part of the minutes of the board of health and in three years eliminated all the poor grade milk. An inefficient inspector came on duty, the farmers lost the stimulus of having a chance to get more pay for their better grade of milk, and their milk deteriorated in quality. These reports suggest that the financial stimulus to the farmer by virtue of impartial inspection and higher prices for the better grades of milk is a most important factor.

QUESTION 2.

Of what value is house fumigation after infectious disease? Discussion opened by Dr. C. V. Chapin of Providence.

Dr. Chapin: Mr. President and Gentlemen: For a dozen or fifteen years previous to 1900 I tried to disinfect houses in the best possible manner. We were the first city to use a steam sterilizer. We abandoned sulphur and used formaldehyde about as soon as anyone, and continued this up to about 1900. Then I began to ask the question which has been propounded today: What good is disinfection? Why do we disinfect? I was led to ask this question largely because we had begun to learn two things: one, that germs die pretty quickly after they leave the body, and the other that the unrecognized cases and carriers are the chief cause of the spread of infectious disease. After considering the question for some time I made up my mind that there were two reasons why we disinfect. One reason is the same reason that we sew buttons on our coat-sleeves—because our ancestors have done so for several hundred years. The only other reason offered is this: That one occasionally finds a physician, a health officer or an old woman who says that little Johnnie caught the scarlet fever because he played with a toy belonging to some other child who died of scarlet fever a year or two before. No one that I know of ever offered any real proof of the value of disinfection. It seemed to me that the best way to find out was to give up disinfection, and see what happened. So we abandoned disinfection after diphtheria in Providence in 1904. We have had no more recurrences of the disease since then than before. Both before and after giving up disinfection we found recurrences after the termination of isolation in between one and two per cent. of the cases. I became so well satisfied that disinfection, so called, is of no use that later we gave up disinfection after scarlet fever. The result was the same. The number of recurrences after we gave it up was practically the same as before. You might perhaps say that our method of disinfection in Providence was not good and that I am simply comparing a period of poor disinfection with one of no disinfection. But the city of Baltimore has been very careful about disinfection and tests by means of cultures and if it is not efficient they send the man back to do it again. There recurrences are about the same as ours. Another way to test the value of disinfection is this: We send away many children from diphtheria and scarlet fever houses, when the disease is recognized and the house placarded, and we keep them away until the period of isolation has terminated and then let them come back. Now if the house is very infectious they ought to contract the disease. About eight tenths of one per cent. of several hundred children brought back to diphtheria houses while we practiced

disinfection, contracted the disease. After we gave up disinfecting it was only five tenths of one per cent. About the same thing happens in scarlet fever. Now it is worth while to consider what happens when children, as soon as the disease is recognized, are taken to a hospital, in both scarlet fever and diphtheria, and particularly in the latter disease. After they return home from the hospital they at times cause infection in the family. They go home at about the same period of the disease at which isolation would have terminated if they had stayed at home. Coming back at this time, there are always a certain number of reinfections or recurrences in the same family. In such cases it is almost certain that the child from the hospital is the cause, and not infection remaining in the house. It certainly is the child who comes from the hospital that does the harm. If in such cases it is the child and not the house that causes the infection, have we any ground for assuming that it is the house which causes the infection when the disease recurs after home isolation? I think we can believe that the house and the things in it are negligible factors in the recurrence that takes place after the termination of isolation. You may argue that the recurrences mean little because most of the susceptible children of the family have been affected before the disease is recognized or within a few days thereafter. But we have still another way of learning whether disinfection does any good. Does disease increase in the community when it is omitted? It did not in Providence; for a few months after we gave up disinfection for diphtheria there was a time when we did not have a case in the city. There has been no more scarlet fever and diphtheria in Providence since we gave up disinfection than there has been in other New England cities.

Dr. Carroll, of Lowell Board of Health: Mr. President, I would like to ask Dr. Chapin as to his observation as regards tuberculosis, whether he has done anything in that line at all.

Dr. Chapin: Mr. Chairman, I have never been able to get any evidence as to the value of disinfection after tuberculosis. The disease is so slow in developing that it seems to be impossible to get any data. Dr. Woodward in Washington, has published data which on their face indicate that disinfection is of great value after tuberculosis, but it never seemed to me that the figures proved much, for the reason that in a large portion of the cases it is impossible to find where the disease was contracted.

A Member: I would like to ask Dr. Chapin if he believes in the proper disinfection of clothing that has been in close contact with a patient.

Dr. Chapin: I think it is desirable, if possible, to carry out disinfection all through the disease, to keep everything clean and free from infection as much as possible. I would like to have everybody do this but practically I think there are very few who do.

Dr. Gardner Swarts, Secretary R. I. State Board of Health, Providence, R. I.: Dr. Chapin always gives us the practical results in these questions. Let us consider them from the laboratory side. What may we effect by fumigation? Our bacteriological tests inform us that the fumes of sulphur are not destructive to bacterial life. Formaldehyde gas may be effective, but must be applied under certain prescribed conditions. A room must be sealed tightly; the gas in the room must be made a certain pressure; a particular temperature must be maintained; and a degree of humidity. I have yet failed to know of a health officer who was

equipped with thermometer, hygrometer and pressure gauges. Since none of these methods are effective, why go through these motions and produce a fake sense of security when we know all the time that the infectious material is maintained longer in the throat of the patient than in the atmosphere outside?

Question 3.

How may the best results be obtained in the care of the incorrigible consumptive in towns where there are no hospitals? Discussion opened by Dr. E. O. Otis of Boston.

Dr. Otis: Mr. Chairman, I think we might define the incorrigible consumptive as he who willingly or unwillingly, ignorantly or viciously, exposes others to infection in his community or his family in his own house. This question is one that has arisen in every state and has been provided for in some of them by the enactment of a special law. The states of Ohio and New Jersey, for example, have special laws in regard to it whereby a consumptive can be taken to a hospital and isolated. If the law which was proposed by the recess committee appointed by the legislature of 1913 to the legislature of 1914 had been passed, we also would have been provided for this condition in the state of Massachusetts.

House No. 931.

AN ACT RELATIVE TO THE REMOVAL OF CERTAIN PERSONS INFECTED WITH TUBERCULOSIS.

Be it enacted, etc., as follows:

Whenever it shall appear to the state board of health or to a local board of health that, by reason of improper care, improper household conditions, or improper habits, the condition of a person suffering from tuberculosis is such as to endanger such person or his family or the public, and that the conduct of such person with regard to his health is not governed in accordance with the advice of a person competent to advise with regard thereto, such board of health may request the justice of the police, municipal or district court having jurisdiction in the district wherein such person resides to order his removal either to some proper institution for the care of tuberculous patients in the locality in which the patient resides or to some institution maintained by the state, and such person shall remain in such institution until discharged by the authorities in charge thereof: *provided, however,* that, whenever the patient shall so request, the authorities in charge of said institution shall notify the justice of the court which has taken original cognizance of the case of the desire of such person to be discharged, and thereupon, after hearing, the court may order such discharge or take such action with regard thereto as may be deemed expedient. Any authority in charge of such institution shall, upon failure to communicate the request of a patient as herein provided, be deemed in contempt of the court having jurisdiction of the matter.

If that law had been passed, then the local board of health could have appealed to the State Board of Health and the incorrigible patient by the procedure here outlined would have been taken to the state hospital at Tewksbury or some tuberculosis hospital. The board of health in Boston either has or had assumed the authority to do that very same thing. The local boards of health apparently do not dare to do so. They do it in New York City. Now it seems to me that the wise local board of health can or should assume more power in certain cases when the health of the community is at stake than the strict letter of the law allows them to. I remember Dr. Darlington, who was commissioner for health in New York, told me he not infrequently went beyond the law in the protection of the public health and he never got into any trouble. It seems to me that the local boards might in the same way take some risks of a lawsuit in the protection of the public health by the forced removal of an incorrigible consumptive. The state now requires all localities of 10,000 inhabitants or more to establish local consumptive hospitals and when this is done, if the small town is in the vicinity of one of them the board of health of the small town might arrange with the authorities of the nearest consumptive hospital and hand over to them its incorrigible consumptive, taking the law into their own hands so to speak. Failing in this, I do not see what can be done except careful and constant supervision by the local officers or by the physician or by the visiting agent of the incorrigible consumptive. A great deal can be done with the incorrigible consumptive by careful supervision, education and training. He can be told he may reinfect himself or lose all his chance of getting better if he is not careful in disposing of his sputum. And I do not see why after being warned it could not be considered a misdemeanor to disobey the instruction of the board of health. If he is indigent, as I suppose such cases are as a rule, and is supplied with public aid, that might be cut off until he reforms. You can think of a number of things boards of health might do to protect the family of that ignorant, wilful consumptive who was exposing them to infection. But, gentlemen, this problem is not confined alone to the indigent consumptive. You and I know perfectly well that there are plenty of intelligent consumptives who are able to be about their work, who maintain an equilibrium between their toxaemia and their resistance and yet who have advanced tuberculosis, and are emitting all the time tubercular bacilli. It may be a professional or business man, and yet on account of his social or business position he is afraid to take all the precautions, although he knows well enough what they are. You recall the incident of a doctor in New York who took a sputum cup and went into one of the elevated trains and pretended to have a tremendous cough and then expectorated into the cup. Very soon, everybody left that car and he was alone. The consumptive who is willing and would like to exercise all these precautions knows that

he will be ostracised from society, he will lose his business if he does it. Or if it is a workman who is perfectly willing to carry out all the precautions necessary, he knows well enough he will lose his job if he uses the sputum cup and so expectorates upon the floor. This is one of the problems that is not yet solved.

The problem of the incorrigible consumptive, whether in small town or city, can only be definitely solved by a specific law empowering the board of health to remove the offending person to a consumptive hospital, and by providing such a hospital for this class of cases. Furthermore, the public must be taught that a consumptive who properly disposes of his sputum is not a menace.

Dr. Kent, of Attleboro: We have had recently three such cases in Attleboro and each time we have succeeded, after giving the patients all the care and instruction that we could, both by the board of health and the district nurse, in having those patients, with the aid of the court, sent down to the State Farm at Bridgewater where they cease to be a menace to the public health of our town.

Dr. Coolidge, of the Lakeville State Sanatorium, Middleboro, Mass.: The incorrigible consumptive is not disposed of when he is landed at a state institution, because he may still remain incorrigible. If he remains incorrigible inside the institution so that we cannot keep him there, he is sent back into the hands of the town which sent him. So the problem is more far-reaching, it seems to me, than we have supposed it to be. To my mind—and I have maintained it ever since I have been conducting one of the state institutions, the Lakeville State Sanatorium—we shall never get this matter in hand until an institution is provided either in connection with some of the institutions already in existence or in a new institution, for the compulsory segregation of incorrigible comsumptives. And the incorrigible consumptive is not necessarily a criminal or a malicious person. I should rather call them unteachable consumptives because we have many highly respectable people at our sanatorium who come in an advanced stage of the disease and who in giving a history of their disease say, "Doctor, I don't believe I have got consumption." I believe that man is just as much a menace to the community as the drunkard or the malicious person. I believe the compulsory segregation of these unteachable consumptives is absolutely necessary.

Dr. Kent: I would like to say that these three men were sent to Bridgewater for an indefinite term; they cannot get away from there.

Dr. S. H. Durgin, Millbrook, Mass.: I have yet to learn that there is not law enough in Massachusetts to empower every board of health to convey an incorrigible consumptive to a hospital and to keep him there until he is a safe person to go about. It is the place where you can control him, not through the courts or any other institution. I don't know how it is since I left the board, but when I was a member of the board of health of Boston the only obstacle we had in front of us was the lack of hospitals. We filled every bed as long as there was one left for us, we begged others in town and out wherever we could.

A Member: I would like to ask in regard to the cases sent to Bridgewater from Attleboro, how that was brought about. It is hardly possible to believe it was done because of their having consumption.

Dr. Kent: I would like to say it was done not on the ground that they had consumption, but it was done on the ground of their being a menace to the public health.

Dr. Durgin: He is the only person for whom I have any remark to make. The person who is intelligent in his home and in public may still pursue his avocation and not be a menace to the community, but he who is a menace to the community and is so looked upon by the

board of health, I believe it is their duty to find a hospital if there is one within reach and then seize that person and put him where he belongs. I would encourage everyone to take such care of himself, his family and the public that he should be no menace; I would do everything possible to teach them to do that. It can be done. I would not confine a patient anywhere unless I knew the man to be a menace.

Mr. F. A. Sullivan, of Board of Health of Haverhill, Mass.: The question that is before this body for discussion is a question that has been foremost in the minds of our local board for some time. We have an institution in Haverhill with a capacity of thirty beds. Previous to this time we have had some consumptives, incorrigible and everything else that could be applied to an individual. Now as regards the bill of Dr. Otis, I think that bill does not go far enough. In order to get a man committed to an institution he has got to go before a justice of the court and if that man sees fit he has got to have a hearing. Now we all know that judicial minds are at times very sympathetic, and, with all due respect to our courts, we find they do not coöperate with our boards of health in the communities in which we reside. Within the past ten years a justice of the local court made the remark to the board of health that boards of health did not run everything within their own precincts or their own municipalities. We have one instance of a certain man who has cost the city about $1,500 or $1,600 for his board in various places. He dictates to us where he shall go. He refused our suggestion to live in one of the best hotels in town and he has gone to Reading; has come back to Haverhill and notified us he was there. When he sees fit he leaves the institution and we get hold of him and bring him back again. Recently this man has been before the local court. It was impressed upon the court how dangerous he was and that the best he could do was—we said almost as much as to say it—to send him to Bridgewater; but in that attempt we failed. I think this bill should be so changed that a commission should be appointed in fairly large districts where this commission shall have control over those individuals. I suppose the city of Haverhill may have been one of the first of the smaller cities which took advantage of the old rule for taking a person ill and dangerous to the court. We did that in the case of an unfortunate individual who had three or four children living in squalid circumstances and the court sent this man to what was then a part of our tuberculosis hospital, a series of shacks. After this man had been there for a certain period of time his friends got knowledge of it and through habeas corpus proceedings they took his case up to the superior court. The judge would not give any decision on it but simply remanded this man to the custody of the local board. Now if there were a law in Massachusetts to protect boards of health, a justice of the higher court could have passed on the law and could have passed on that case and not simply remanded the man to the custody of the local board.

Dr. Elliott Washburn, Superintendent Rutland State Sanatorium, Rutland, Mass.: Last week at the New England Conference on Tuberculosis at Bangor I heard Mr. Chester Bryant, agent of the board of health of Haverhill, give an admirable address upon the subject of the "incorrigible consumptive" which I hope will be printed so that every member of this association may see it. Two years ago it was my fortune to be a member of a committee of the state inspectors of health of Massachusetts whose especial duty it was to gather and present to the State Board of Health data which that board might use in formulating, together with the trustees of hospitals for consumptives, a state policy in tuberculosis. Wherever this committee went, and its investigations were carried on in every part of the Commonwealth, we found on the part of health authorities, persons interested in the tuberculosis problem, social workers and many other citizens a strong, in instances almost compelling, demand for a definite, specific law which should control the incorrigible, unteachable and careless consumptive. Although there is existing law which some city and town counsels consider sufficient to meet the existing situation yet the word "tuberculosis" is not specifically written into the law and we find certain other legal authorities in other cities and towns who advise their boards of health to keep their hands off such cases. So in Haverhill the city solicitor instructed the

board of health that they had sufficient authority under the law while, on the other hand, in the adjoining city of Lawrence the city solicitor told the board of health of that city that it had no such authority. With these divergent interpretations of the law naturally boards of health are timid in their action. I believe we need a definite, specific law whereby, when necessary, this class of dangerous consumptives may be compulsorily isolated. Without such a law much of the effort of the Commonwealth in the tuberculosis problem comes to naught.

Mr. Borden, of Fall River Board of Health: In regard to the provisions of the law, I think it is essential that the court should enforce it because our constitution requires certain safeguards upon the part of the state. I am afraid that no commission could incarcerate a person without amending our constitution. In regard to the methods of taking care of the incorrigible, it seems to me we ought to begin with a series of provisions. In the first place, we ought to have in every place a hospital where we can hold forth to the patient every possible facility for cure if cure is possible, not to consider that they are incorrigible because they feel something should be done for them at our hospitals and are not satisfied with the results. Then we ought to have a hospital which ought to be a house of detention—it ought not to be a penal hospital, it ought not to be an insane asylum, it should be a state institution, it should be named a hospital for incorrigible consumptives, or some such name as that, so that a patient who went there had to remain there under supervision until it became apparent he could go to another hospital and behave and would not be under the coercion they receive there. In other words, a willing patient ought not to be made to go to a hospital where unwilling patients are compelled to reside. There are different types of incorrigibles; some of evil habits, some indisposed to treatment; they ought not to be made associates with people who are willing and desirous to do what they can for a cure. Now we have not yet begun to get the facilities we need for the care of this disease in this state, and I hope that as soon as the legislature permits proper laws will be made, proper tools will be provided and then the boards of health will act freely. You cannot expect a board of health to meet with the approval of the citizens in its locality which incarcerates persons who are guilty of no crime except being sick of a disease which they do not appreciate, and still does not make every provision for curative methods.

Question 4.

What are the best methods for the control of markets, restaurants and bakeries? Is the use of a score card practical? Discussion opened by Dr. Alexander Burr of Boston.

Dr. Burr: Mr. Chairman, In answer—and I will take a very short time—it seems to me that if the unclean stores, unclean persons and unclean methods are of any importance in health rule, there is just one thing to do and that is to license these different stores. I do not know any other way you can control them but by licensing them, following that by proper and repeated examinations of the stores and then have power to revoke the licenses if not satisfactory. In regard to the second question, the practicability of score cards, I suppose that refers to score cards for stores. These are not much used at present. I think the score card is practical in places outside of your borders where you fix a standard for such places as dairies. I do not think it is as satisfactory to use a score card within the borders of your city as it is to use a report card which goes

into detail. The score card does not state the actual defects, it gives you the percentage for the conditions found, whereas the report card goes into detail and can be followed up quickly. I do not think it is as practical to use a score card as it is to use a report card going into the details.

Mr. R. N. Hoyt, Coöperative Boards of Health, Wellesley, Mass.: I am very much interested in this question because it is something which I have taken up recently. We have a system of scoring all places where food is sold, and we score them because we wish to use publicity in order to secure improvement. If you tell a man you are going to publish his score in the paper, after you have given him a chance to improve—that is to say, publish his second score, not his first—you give him the greatest possible inducement for improvement. That is the method we are adopting. I would be glad to know if any others are using that method. I would like to say something about one statement which was made in regard to publicity of milk analyses. The statement was made that they cannot be understood by the general public. I do not think that statement will be made by anyone who has tried to teach the public to interpret milk analyses. We have tried it, and we find that they do understand. They say to the milkman, "Your analyses have not been good. Why is it?" The result is that the milkman comes to the inspector to find out how he can improve and get a good record. With publicity, the milkman or marketman, as the case may be, comes to you. The recommendations you make at their solicitation are taken in a very different way, than if you went out to the marketman or milkman and tried to show them how to conduct their business, forcing yourself upon them. In the former case, you come as a friend, and you make it financially worth their while to conduct their business not up to the bare minimum of excellence which you can enforce by law, but up to the maximum of their ability.

Dr. Croston, of Haverhill: I will say that the city of Haverhill for the past two years has been scoring its markets, bakeries and all places where food is sold, reporting the cards in the papers, improving the markets and creating a little more trouble for the board of health.

Mr. Howe, of Board of Health of Framingham, Mass.: I would like to say in answer to the next to the last speaker that we held a hearing in Framingham to find out the attitude of the marketmen and grocerymen, and the representative of the largest market said that he was very glad we were going to do so, not only for the health of the community, but because he thought it would stimulate his employees in keeping up the stores better than they would otherwise. He said as a proprietor he wanted things right, but as every practical man knew, sometimes conditions were not as they would like to have them, and by having an inspection from outside to keep them up to standard it would be a help to the employees and to himself.

Dr. Maloney, of Fall River Board of Health: I think I agree with Dr. Burr that the detail report card rather than the score card is the best for market inspection system. We have had market inspection in our city for four years. We have tried various sorts of schemes and the detail report card seems to us more effective in the cleaning up the stores than the score card such as is used in dairy work. It does not seem to be so practical, as Dr. Burr has explained, as the detail report of conditions. Those conditions explain fully to the men, and most men for sanitary reasons clean up. In our experience we have derived a good deal of benefit from the report card. I would like to answer the gentleman who said that any person who made the statement that publicity of milk analyses cannot be understood by the general public had no experience along that line. I have had charge of the milk inspection in Fall River, a city of 125,000, for eight years and we think we have had some experience. We have tried that thing out very carefully and found it impractical. As a matter of village gossip in a place like Wellesley and some other such places publicity might be acceptable.

QUESTION 5.

Are boards of health in different cities and towns supposed to furnish silver nitrate solution to midwives? Discussion opened by Dr. W. P. Bowers, Clinton, Mass.

Dr. Bowers: I am asked to discuss the following question: "Are boards of health in different cities and towns supposed to furnish silver nitrate solution to midwives?"

This question implies either that boards of health do furnish nitrate of silver solution to midwives or that requests have been made for the distribution of this remedy, and if so, it may be assumed that someone wishes to know whether or not boards of health should, either as a matter of good policy or as a definite duty, furnish this solution to midwives. In other words, is this distribution of nitrate of silver solution to midwives a function of a board of health?

A consideration of this subject involves a study of the law. Sections 49 and 50 of the revised laws require the nurse, relative, or *other attendant* having in charge an infant with inflamed, swollen, or red eyes, or where there is an unnatural discharge from the eyes within two weeks after birth, to report the condition to the board of health. A penalty is provided for non-compliance with this law.

Chapter 458 of the Acts of 1910 provides that the State Board of Health is given authority to distribute gratuitously to all *registered physicians* an outfit for the prophylactic treatment of infants at birth. No authority is, however, given to distribute this outfit to any other person. In order to facilitate the prompt use of this valuable prophylactic agent, the State Board of Health has established depots for its distribution.

Lying-in hospitals are licensed by the State Board of Charity and in the law providing for this function, authority is also given to make regulations governing the work of such hospitals.

Regulation No. 8 reads: "Each licensee shall be responsible for the use at every birth for the prevention of ophthalmia neonatorum, of either the one per cent. solution of nitrate of silver furnished to physicians by the State Board of Health, or some similar preparation having the approval of the said board."

If midwives conducted lying-in hospitals it might be inferred that authority had been given them to use nitrate of silver solution, but I have been unable to find any midwife licensed to conduct such institutions.

The practice of the midwife has been defined by the Massachusetts Supreme Court to be the practice of medicine, and any person practising medicine without having been registered by the State Board of Registration in Medicine is performing an illegal act, hence it can be logically

claimed that when a board of health furnishes to a midwife the solution of nitrate of silver distributed for the use of physicians only, and the use of which constitutes the practice of medicine, then that board is aiding and abetting a criminal practice. A board of health is a legally constituted body and no legally constituted body, nor any other body or person can properly aid and abet a criminal practice. Therefore, logically, boards of health cannot be supposed to furnish nitrate of silver solution to midwives.

It must be confessed, however, that a superficial study of the situation seems to show an embarrassing complication, for Section 1 of Chapter 280 of the Acts of 1912 states that physicians and midwives shall within forty-eight hours after the birth of every child in cases of which they were in charge, mail or deliver to the clerk or registrar of the city or town in which the birth occurred a notice, etc., and again in Section 2 of the same chapter, it is provided that physicians and midwives *shall* make and keep a record of the birth of every child in cases of which they were in charge, and again later is the same section the fee of the physician or midwife who performs this work is specified. Still later in this section a penalty is provided for not complying with this act.

Massachusetts therefore provides under her medical practice act that midwives cannot practise, but pays her twenty-five cents every time she certifies that she has broken the law and then fines her, one hundred dollars in some instances, because she took the bait of a quarter of a dollar. If ever there was a law devised for ensnaring the ignorant, it certainly exists in this chapter.

But it has been decided by the courts that this chapter does not interfere with the medical registration law nor modify it in any way and did not contemplate legalizing the work of the midwife, but simply provides that since the reporting of births is essential, it must be done by the one in attendance who may be acting in an emergency and without pay, just as in Section 49 of Chapter 75, a householder who knows that a person in his family or house is sick of an infectious or contagious case must report the fact to the board of health.

No one has yet claimed that the mention of the householder and the placing of this responsibility upon him confers the right to care for the case of infectious or contagious disease as a physician, or to do anything more than to simply report the same.

The only justification for this Section 1 of Chapter 280 of the Acts of 1912 is the effort of officials having the responsibility for vital statistics to secure prompt and accurate returns of births.

Sooner or later the question of whether the end justifies the means must be answered. Or to put it plainly, can we imperil the lives and health of women and children by adherence to a plan which only secures better birth returns?

Some students of the problem will contend that the midwife should be licensed because she is here as a part of the scheme of the domestic life of our foreign population, and further, that her work is less hazardous to her patients than that of the physician.

We know that the practice of the midwife is unclean, inefficient and dangerous, and if doctors do not do better work than the midwives, let us start a campaign against inefficient doctors and improve our faulty medical registration act.

We have a responsibility for our foreign population for they are here by our implied invitation. We must elevate them to our standards. If we cannot recognize their adherence to the custom of employing the midwife, we must provide a substitute which is better, or else we will be compelled to recognize and register the midwife.

But that is another story: ethical, sociological, and professional, too deep and complicated for a short discussion.

It may be interesting to know a few general facts:

According to reports of boards of health of 69 cities and towns of over five thousand inhabitants of Massachusetts, there are four hundred and sixty-four known midwives, with several more suspected.

Boards of Health of Pittsfield, Fall River, Springfield, North Adams, Gloucester, Lowell, Brockton, Cambridge, Fitchburg and Chelsea are supplying nitrate of silver solution to midwives. Pittsfield reports that this was done at the *request* of the State Board of Health.

Then ten cities are supplying one hundred and four midwives with a remedy which, in my opinion, they are incompetent to use. If used at all, it should be used by a nurse or physician who is trained to apply it. Those who understand the care of cases of ophthalmia neonatorum insist that it not only requires the service of a nurse, but of a nurse especially trained to properly apply a remedy to the eyes of an infant. How many of you who practise obstetrics and use the nitrate of silver solution would be ready to testify that a midwife unaided could or would apply the nitrate of silver solution safely and effectively? If you are ready to so testify, you have a knowledge of a better class of midwives than those who have come under my observation.

Among the letters received I wish to read three which are representative to a certain extent of the answers which have been sent to requests for information:

GENTLEMEN:

Your letter of Oct. 21 at hand in answer to you would reply we have not got any midwives practising in our town, and the Board of health have not got any nitrate of silver solution.

The Board of Health of ——— have never had any antipestilential from the state that I know of, and any thing that the state would furnishes for the Doctors free I would be pleased to have you send me that would be of use to the Town and I will hand same to the Doctors in the Town thanking you in advance I remain

GENTLEMEN:

Replying to yours of the 21st in regard to midwives:

Naturally we do not encourage an illegal practise by furnishing nitrate of silver or anything else. On the other hand we have successfully prosecuted recently the only case we have been able to discover in the city (fined $100.00 illegal practise and $10.00 failure to report birth). One or two others we have caused to stop the practise without court prosecutions because of insufficient evidence and also that the persons were willing to comply with the law after they understood it.

We furnish nitrate of silver to doctors only who, as far as we know, are the only ones in charge of childbirth cases in this city.

DEAR SIR:

Answering your letter of the 21st instant, I beg leave to advise you that we have, at least, two women who practice midwifery in ———, and their practice is confined entirely to Poles and Italians.

Not very long after you were good enough to send me copies of the decision of the Supreme Judicial Court, I send word to these two women through the police department to discontinue the practice of obstetrics. I remember that when I told our official city registrar that it was my intention to do this he, in a way, demurred, and said that the returns of births made by these two women were more complete and satisfactory than any returns that are filed in his office by physicians.

I almost regret that I notified them to discontinue because since that time I understand that neither of these two women have made any returns of births to the registrar. Failure to make these returns, of course, will indicate an apparent increase in the proportion of deaths to births, which I do not like.

I have reason to believe that these two women still practice their profession in our city, because our visiting nurse, every once in a while, runs across a new-born baby in a Polish or Italian family; but it is absolutely impossible to get a word of information in regard to the person who attended the mother professionally. All that they will say is "neighbor help."

We have never furnished any nitrate of silver solution to midwives, for the reason that no midwife has applied for it, and no person other than a physician has ever applied for the nitrate of silver solution.

If either of these midwives have ever had a case of ophthalmia neonatorum or any other affection of the eye of the newly-born, they have never made any report of it to this office.

To recapitulate:

The midwife has no standing in law. If she is not registered as a physician, and practises midwifery or applies nitrate of silver solution to the eyes of an infant, she is practising medicine illegally and is a proper subject for prosecution.

There is no provision in law permitting the State Board of Health to distribute nitrate of silver solution to any person other than a physician. If a board of health supplies a midwife with nitrate of silver solution, this board is encouraging and aiding an illegal practice.

Therefore boards of health are not supposed to furnish nitrate of silver solution to midwives.

A Member: Mr. President, I would like to know if Dr. Bowers considers the preventing of disease as the practice of medicine. Does a woman, when she takes a baby from a house to prevent it from being infected, practise medicine? Is the fact that she is putting nitrate of silver solution into the eye the treatment of a disease which exists, or is it merely the prevention of disease?

Dr. Bowers: The practice of medicine is just as much to prevent as it is to cure disease. Prevention is just as much the practice of medicine as treating the patient after he is sick. If the gentleman will study the dictionary definition of the practice of medicine he will become satisfied as to the attitude we ought to take as to this subject.

Mr. Henry Copley Greene: I think I am warranted in saying that the Commission for the Blind has recognized that there have been a number of midwives commonly practising, for whom the judges would not even issue a warrant. We have urged these midwives to go to the boards of health, and report cases of ophthalmia neonatorum. In certain instances the boards of health have carefully picked out the best midwives, and shown them how to use the prophylactic. They went on doing that as a duty, sometimes as a nurse would under a doctor's direction, more often not. Since then we have found fewer cases of infant blindness in the practice of midwives. Now, I do not believe in having midwives, if we can help it. But while they are here, and as long as they are permitted to practise, it seems to me better to let them have the prophylactic, as a preventive measure, rather than to have blind babies who grow up to blind adults at a cost, not only of suffering to themselves but of great sums of money to the state.

Question 6.

Why do some physicians decline to report tuberculosis when they know the law requires them to report all such cases (Acts 1907, ch. 480)? Discussion opened by Dr. T. B. Shea of Boston.

Dr. Shea: Mr. Chairman, one of the great reasons, and probably the principal reason, that cases of tuberculosis are not reported as the law demands is that unfortunately the person afflicted with this disease falls into the hands of some practitioner who has not even grasped the modern treatment of this disease. The interests of the patient demand that the case should be reported promptly. If we consider today the resources of the health department that can be furnished, not only to the patients, but to the physicians, it is beyond understanding why some physicians will fail to report, not only tuberculosis, but also other diseases which are dangerous to the public health. Once the case is reported, the patient is immediately placed under good sanitary conditions, not only at home, but also at his place of employment; there is a corps of medical inspectors and visiting nurses who are willing to give aid and counsel to the physician. The physician has the use of a number of laboratories connected with the health department; hospital accommodations are furnished if the case is such as requires hospital treatment. Then, again, by having his case reported to the department the patient is compelled to comply with the regulations made for his care, and is prevented from reinfecting himself and other members of his family or the community. Then, again, as regards the physician, a great responsibility is removed from the physician's shoulders once the case is reported to the health department. The health department under the law is obliged to take all necessary measures to control and to prevent the spread of the disease. So, if the interest of the patient or of the physician is considered it is beyond understanding why

they are not reported. One unreported case would probably do more damage than one hundred reported cases. Now, as regards the situation in Boston, I can speak, probably, officially. We have about 3,000—between 3,000 and 3,500 reports annually. Of those cases in the past few years over one hundred were found not to have been reported. The majority of those cases were medical examiner cases and medical inspector cases where the diagnosis was made *post-mortem;* many cases were found also on autopsy. Now this condition in Boston may be accounted for by the policy pursued by my board the last few years. After several notices to the profession that not only tuberculosis but also other diseases that have been declared dangerous to public health must be duly reported to comply with the law, several physicians were summoned into court; and as the minimum fine in those cases is not less than fifty dollars, the cases as a result have been reported promptly. These cases also were given wide publicity through the public press and the different medical journals, and the condition in Boston is all that could be desired as regards the registration of these cases. However, since this question was proposed for discussion I have looked up some of the mortality reports in this state and it is surprising to see in some cities and towns that the deaths outnumber the cases reported in these communities. Now, such a condition of affairs is not just to the citizens in this commonwealth. They have their health departments, elected for the protection of the public health, and to allow the cases of death in a year to exceed those reported shows no healthy condition of affairs in that community. Now, although it is late, I would like to say a word on the question of forcible removal which will possibly be of some advantage to the other members of this association. We have been making forcible removals in Boston, not only of cases of tuberculosis but also of smallpox, scarlet fever, in fact any disease that is dangerous to public health. It is a daily occurrence. For the last fifteen years we have been removing those cases to the hospital whenever they became a menace to the family or to the neighborhood. Some cases have been tested in court. One case was tried and the verdict was in favor of the health department. Another case of habeas corpus was tried in the supreme court for the release of a man confined in the scarlet fever hospital. We find in Boston the courts are sustaining us in all measures we have taken as regards the protection of the health of the community.

QUESTION 7.

Why is it that so few towns of 10,000 inhabitants or over have complied with the law requiring them to maintain a tuberculosis dispensary (Acts 1911, ch. 576—Acts 1914, ch. 408)? Discussion opened by S. H. Stone, Boston.

Mr. Stone: The report of the Special Recess Committee on Tuberculosis which sat during the summer of 1913 states: "This Committee believes that it is imperatively necessary that the dispensary law should be more generally complied with and in order to obviate confusion, the State Board of Health should be given power to define the dispensary and establish a standard for it. The dispensary is an indispensable link in the system of home treatment of the disease, where not only medicine and other material relief but teaching as to general hygiene and sanitation may be obtained."

The law (Acts 1914, Chapter 408) which requires cities and towns of 10,000 inhabitants and over to establish tuberculosis dispensaries is as follows:

"Every city and town containing a population of ten thousand or more, as determined by the latest United States census, shall establish and maintain within its limits a dispensary for the discovery, treatment, and supervision of needy persons resident within its limits and afflicted with tuberculosis, unless there already exists in such city or town a dispensary which is satisfactory to the State Board of Health. The said dispensaries shall be subject to the regulations of the boards of health of the cities or towns in which they are respectively situated, and shall be inspected by, and be satisfactory to, the State Board of Health. A city or town subject to the provisions of this act which, upon the request of the State Board of Health, refuses or neglects to comply with the provisions hereof, shall forfeit not more than five hundred dollars for every such refusal or neglect."

There are 54 cities and towns of 10,000 inhabitants or over in the state of Massachusetts. While I have no absolutely accurate figures as to the number of tuberculosis dispensaries in the state, so far as I can find out there are not more than 13 that can in any way be called *municipal* dispensaries, and it is doubtful if all of these would meet with the approval of the State Board of Health.

About five or six are run on the coöperative basis between private agencies, tuberculosis associations, district nursing associations, and hospitals and the board of health.

In addition to these 13 there are about seven run entirely by anti-tuberculosis associations.

I do not believe that it is necessary for anyone to point out to this

gathering the great value of the dispensary in the fight against tuberculosis, especially if such a dispensary has one or two visiting nurses attached to it.

It seems to me, Mr. President, that it would be interesting to know why this law is not being complied with; and, if it is an undesirable law, to know just what the objections are.

Dr. L. A. Jones, of North Adams: Mr. President, I have a communication bearing on this subject, from Dr. Hanson, acting Commissioner of Health, which I will read:

October 29, 1914.

To the Members of the Massachusetts Association of Boards of Health:

On the program for today's meeting question 7 is:

"Why is it that so few towns of 10,000 inhabitants or over have complied with the law requiring them to maintain a tuberculosis dispensary?"

If one reads the dispensary act carefully (Chapter 408, Acts of 1914) he will see that such dispensaries as are referred to shall be established "*unless* there already exists in such city or town a dispensary which is satisfactory to the State Board of Health." From a practical viewpoint this proviso in the dispensary law means two things. In the first place, the law fails to define the meaning of the word "dispensary" and many communities fail to establish institutions which measure up to modern requirements. In the second place, were some minimum requirements set by the State Department of Health for a standard for all dispensaries, it would still be necessary to consider most carefully the needs of individual communities.

The first difficulty in the enforcement of the law was pointed out by the joint board of the State Board of Health and the Trustees of Hospitals for Consumptives in their report to the Legislature in 1912 (House Document No. 1950). In 1914 the dispensary law was amended, but the amendment did not include a definition of dispensary. It only stated words to the effect that when dispensaries are established they "shall be inspected by and be satisfactory to the State Board of Health." In other words, the dispensary law is as difficult of enforcement as it was originally.

It would appear to me desirable for the Association to consider whether a committee of their number, appointed by the President to represent the various local interests, might not be a distinct help to the State Department of Health in the enforcement of the dispensary law.

Wm. C. Hanson,
Acting Commissioner of Health.

I beg to add a few words as to why tuberculosis dispensaries have not been established in some of the smaller cities and towns.

One reason is that in these places there are few dispensaries of any sort now to be found, and the people have not yet acquired the dispensary habit, or the idea of going to such places because there has been no opportunity. For example, in Pittsfield, a city of 35,000 inhabitants, for two years one of the hospitals has maintained an out-patient department, and the total number of persons visiting it during the two years has been about 600. Of these over 60 per cent. have been discharged hospital patients who returned for dressings. Of the remainder the majority have been minor surgical cases, and the medical cases very few. The total of tuberculosis cases has scarcely exceeded an average of one a month, and these were mostly brought by the visiting nurse or others.

The majority of the people seek their family physician, who undertakes their care without reference to whether they are able to pay or not.

Another reason is that in some places, people who might otherwise seek a dispensary depend upon the lodge physician or society doctor. To illustrate: In North Adams, with a population of 22,000, it is conservative to say that there are 8,000 people approximately, who receive medical care from society physicians. These physicians receive one dollar per member per year for their services. In two societies, with an aggregate membership of about 1,200, the physician receives two dollars per member, and attends in addition the member's household as well. Such people would not be apt to seek a dispensary.

Another practical difficulty in the way of establishing tuberculosis dispensaries is that there is often a lack of professional harmony; and that were a competent man—if indeed such could always be found—appointed to dispensary service, such a man would not always receive the assistance and backing of the other physicians which a successful dispensary would require.

A tuberculosis dispensary would require, always, but especially in its beginning, a nurse

trained in tuberculosis work. But where the public sentiment of a community will not justify the employment of a nurse for school or other health work, it will be difficult to secure a nurse for this work.

For these and other reasons the problem is not simple. The whole thing comes back to the education of the public to the advantages of such dispensaries. Because, unless you have the backing of the public, it would be difficult to carry out the law where such knowledge is unappreciated.

MEMBERS OF THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

NOVEMBER, 1914.

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Dr. P. Challis Bartlett, 583 Beacon St., Boston, Mass.
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Edith Beckler, Bacteriologist, State Health Department, Boston, Mass.
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Dr. E. M. Brastow, Inspector of Animals, Wrentham, Mass.
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William H. Dodge, Leominster, Mass.
Fred S. Dodson, Board of Health, Wellesley, Mass.
Thomas J. Donnellon, Board of Health, Boston, Mass.
Dr. A. W. Draper, Milton, Mass.
Dr. James H. Drohan, Room 4, Satucket Bldg., Brockton, Mass.
John E. Drury, 44 Hanks St., Lowell, Mass.
Michael Duffley, Town Hall, Brookline, Mass.
Dr. F. H. Dunbar, 46 Cornhill, Boston, Mass.
Dr. S. H. Durgin, Millbrook, Mass.
Mr. Charles W. Eaton, Secretary, Board of Health, Duxbury, Mass.
Dr. Carl H. Eidam, 334 Prospect St., Lawrence, Mass.
Dr. W. L. Eisner, Board of Health, Pittsfield, Mass.
George H. Ellis, 1245 Commonwealth Ave., W. Newton, Mass.
Dr. Ernest B. Emerson, State Farm, Bridgewater, Mass.
Dr. Herbert C. Emerson, 177 State St., Springfield, Mass.
Dr. Harold C. Ernst, Harvard Medical School, Boston, Mass.
Dr. G. B. Fenwick, 19 Cary Ave., Chelsea, Mass.
Dr. James B. Field, 329 Westford St., Lowell, Mass.

Dr. E. W. Finn, 17 School St., Dedham, Mass.
Dr. Lewis Fish, 86 Day St., Fitchburg, Mass.
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Dr. Langdon Frothingham, Harvard Medical School, Boston, Mass.
Dr. Frederick H. Fuller, Walpole, Mass.
Dr. Geo. S. Fuller, 22-24 Jackson St., Lawrence, Mass.
Dr. W. W. Fullerton, 106 Main St., Brockton, Mass.
Dr. J. Arthur Gage, 64 Central St., Lowell, Mass.
Stephen DeM. Gage, State Board of Health, Providence, R. I.
Dr. William Gallivan, Board of Health, Boston, Mass.
Dr. George W. Gay, Hammond St., Chestnut Hill, Mass.
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HEALTH DEPARTMENT REPORTS AND NOTES.

REPORTS.

Louisiana.

The most noteworthy feature of the biennial report of the State Board of Health of Louisiana, under the presidency of Dr. Oscar Dowling, for 1912–1913, is the account of the activities directed toward securing more effective health organization throughout the state. To determine the status as to local health organization and service an inclusive questionnaire was sent to each mayor, health officer, and president of police jury throughout the state. In view of the present movement toward reorganization of the sanitary systems of whole states, results and the conclusions reached in Louisiana are well worth quoting at some length:

"There are in the state 195 incorporated communities. Of these 156 sent replies to questionnaire. The records show 104 communities having duly qualified health boards. In 73 of these no salary is attached. Where there is compensation, the amounts are from $50 to $720 annually, average $191 a year. In 37 there are appropriations; these range from $50 to $2,500. Omitting Alexandria and Lafayette (Shreveport, Baton Rouge and Monroe reports were not received), which appropriate each $2,500, the average annual appropriation is $310. In 10 communities there are additional revenues, fines, etc. Only 38 have sanitary inspection. New Orleans is the only city in the state which employs a whole-time health officer. . . .

"The consequence (using the above) is, in 46 per cent. of incorporated communities, no systematic work is done, no accurate records are kept, no reports are made to the State Department, hence with few exceptions, there is no sanitary protection nor sanitary progress.

"The public is not convinced of the value of excellence in service; and capable men, unless actuated by altruistic motives, will not accept office. The solution of the problem lies in the education of the public to the economic and personal advantage of practical application of the science of health. This implies slow progress in sanitary development with the inevitable consequences—for some, a short term of life; for others, suffering and low wage-earning power; and for the community, a continuation of social evils which could be controlled or eradicated.

"Experience shows that local health administration is more efficient when under regular supervision and some direct control by a central authority of the state.

"In Louisiana the inefficiency of the present cumbersome system, with division of responsibility, is proof."

The solution proposed is similar to that recently adopted in New York State: division of the state into districts, each to be supervised by a whole-time health officer, with one assistant, appointment and tenure of office to depend on qualifications and efficiency; local boards in specific lines of administration, to be made directly responsible to the State Board of Health; mandatory employment of whole-time health officers by communities of 10,000 or over; attendance of all officers for five days at annual health conference, expenses to be paid by jurisdiction represented. Such health officers would be required to be qualified, the minimum salary to be $1200. The present overlapping powers of local officers would be eliminated and responsibility fixed. Such supervisory officers would make investigations and recommendations and would secure the enforcement of the State Sanitary code.

A sanitary survey of the state was also undertaken in order that accurate information as to conditions in every community might be available for comparison and more intelligent direction. Two hundred and

forty-five communities were fully investigated with a total of 13,647 inspections, the work being carried on in connection with the "health cars." Reports and recommendations were rendered to the local authorities and in some instances published. This valuable work is very fully reported upon in comparative tables.

An especially interesting portion of the report deals with the "health cars" which have proved highly valuable in popular educational work. The State Board of Health owns two such cars, fitted up with exhibits, equipment for office work, etc., which, through the courtesy of the railroads, are taken throughout the state. In their second itinerary these cars visited 135 communities and the exhibits attended by nearly 100,000 people; besides which some trips were made on special request outside of the State. Several excellent photographs illustrate the report of this work, which represents, in its efficacy in reaching all classes of communities, the most advanced phase of health exhibition work.

The State Registrar reports that efforts are being made to make good the very serious deficiencies now existing in the registration of vital statistics. An entirely new system, which has been put in operation, permits the appointment of postmasters as registrars, with particular reference to the needs of remote communities.

The customary division reports are included. In that of the Analyst the inclusion of a table of food and drug analyses by kind *and* place would seem to be superfluous. It should be noted that many page numbers are dropped where charts are inserted, making the page references somewhat confusing.

Altogether this report is a clear and adequate exposition of progressive state health work.

Florida.

Another state in which steps have been taken to organize the public health service on a district basis is Florida, the annual report of whose State Board of Health (the State Health Officer being Dr. Joseph Y. Porter) for 1913, has come to hand. The state has been divided into seven districts, each of which is under the supervision of an appointee known as an Assistant to the State Health Officer. These assistants make three regular tours of inspection over their respective districts yearly, submitting a report of each trip to the State Health Officer. They also respond to special calls for investigation, advice, etc., and submit an annual report. The supervision exercised by the state authorities through these agents appears to be simply advisory. A considerable portion of the volume is devoted to their reports.

Effective work in publicity, through the monthly bulletin (*Health Notes*), an extensive press service, and special publications, is reported.

Under the head of communicable disease, the free distribution to indigents of diphtheria and tetanus antitoxin through the druggists is mentioned. A diphtheria epidemic of 59 cases occurred, but the source was not clearly located.

Malaria is reported to be on the decrease, presumably as a result of greater use of screening rather than the radical measure of mosquito reduction.

In the discussion on typhoid fever reference is made to the importance of anti-fly regulations, such as those designed to prevent fly breeding in and around stables, to fly-proof surface closets, to screen restaurants, etc., and the like; which, however, are by no means universal through the state. Typhoid fever was added to the list of reportable diseases, and a number of free anti-typhoid vaccinations were made in various communities with vaccine supplied by the State Board. The lower amount of typhoid fever in Tampa is ascribed to greater attention having been paid to the fly question and to surface drainage.

In the discussion on tuberculosis it is rather surprising to find the value of state sanitoria set aside. On the other hand the

employment of public health nurses for this disease is recommended.

Of the hookworm specimens examined during the year 35 per cent. were positive.

The reduction of rabies through muzzling ordinances and destruction of all homeless stray dogs is urged. One hundred and seven persons received Pasteur treatment through the state, and there were six deaths from rabies. Much live stock was also destroyed on this account, the disease being found in a fox, squirrel, chicken, horses, cows, and cats, in addition to dogs and human beings.

A chart showing the recurrence of "smallpox tides" is given.

For convenience' sake the Board maintains three diagnostic laboratories in different parts of the state.

An investigation among the Seminole Indians, with special reference to hookworm, is interestingly reported. Orthopædic work on 25 patients under the "Crippled Children Act" is covered in a well-illustrated report.

"It is a deplorable fact," in the words of the State Health Officer, "that Florida has not a system of vital statistics which can be made useful in obtaining definite knowledge of the life movement of her people, or which can be used to benefit the state commercially."

While progress has been made in obtaining local coöperation, uniform laws are needed, which could be strictly enforced under the administration of the State Registrar or Health Officer, in spite of the unfortunate statement that "it is repugnant to the State Health Officer to hale any of his professional brethren before a court of law for a failure to fulfill what should be a civic duty." A similar comment applies to morbidity reports.

As subsidiary statistical data a number of tables and charts are given. A table of diagnostic tests by disease, month, and place appears superfluous, as well as a table of distribution of vaccine points by place and month.

Rochester, New York.

Differing markedly from the report of the ordinary health officer is that of Dr. George W. Goler, Health Officer of Rochester, for the year of 1913. Instead of confining himself to a mere routine statement of death-rates, cases of disease, laboratory examinations and improvements introduced, Dr. Goler takes each of the important facts which his work has brought to his attention and uses it as the text for an educational dissertation on causes and remedies. No one is more conscious of the defects in the line of defence against disease than he, and certainly no one could show less hesitation in facing the facts and bringing them to the attention of the public.

Such a report is extremely difficult to review because so many of his monographs are worthy of reprinting in full and would be of great value to other health officers as well as to the citizens of Rochester for whom they were intended. Paraphrased, they lose their force and value but we may briefly mention the following subjects which are of especial interest.

In the discussion of births and the birth-rate he tells plainly of the inefficiency of the birth reporting system. In no uncertain terms he denounces the members of reputable medical societies, some of whom shiftlessly let the reporting of births slide and others who connive to thwart the law by signing birth certificates where the accoucheur was an unlicensed midwife. With a birth-rate of 25.55 he finds that 7.3 per cent. of the infant deaths were of children whose births had not been registered. The unlicensed midwife carries on her trade more or less openly in spite of ample law, and when cases have been brought against her before the police court or grand jury as a result of the death of the mother in her care because of ignorance or neglect, no conviction can be secured and the case only serves to give her advertising as a cheap and illegal midwife. The need of replacing the midwife by the trained obstetrician and obstetrical nurse is emphasized in order that all mothers may receive good pre-natal and post-natal care since three-fifths of the women married have no training for motherhood.

Under the head of infectious diseases, child welfare, and elsewhere, the importance of venereal disease is pointed out, showing its true significance as a cause of death and how the lack of health requirements for marriage and of education of the children to an appreciation of the true conditions is a menace to the welfare of the race. The fact that Dr. Goler is very conservative in his statements and figures does not detract from their force.

Other valuable discussions include the causes of death, the importance of the infectious diseases of childhood, the control of cancer, the care of the teeth, child welfare, and child labor. It is reported that one of the great effects of the use of the milk sediment tester has been to cause the use of absorbent cotton as a filter by the dealers, a condition which is also noted in other cities. While this filtering is in a way desirable it is rather superficial and may of course be a source of grave error by the laboratory which does not check sediment tests by means of bacterial counts.

That the work of the department is efficient and not limited to a mere decrying of bad conditions is shown by the death-rate of 14.69 with a population estimated at 235,000 and an infant mortality rate of only 97 per thousand births, notwithstanding incomplete birth reports. In addition to Dr. Goler's general report there are detailed reports by other members of the staff, including the milk inspector, plumbing inspector, medical school inspector, school nurses, chemist, and bacteriologist and hospital superintendent. Unusually complete tabulated and other statistical reports are given as well as a complete financial report. While the alphabetical arrangement of causes of death is better than most of its type it is unfortunate that the International System should not be adopted.

Palo Alto, California.

The report of the health department of the city of Palo Alto for the year ending June 30, 1914, is included in the city report for that time and is interesting as showing what a small city can do when it is awake to the importance of the public health. Palo Alto is located twenty-eight miles south of San Francisco and has only 5,300 inhabitants within its corporate limits. Notwithstanding its relatively small size it spent $2,543.00 on health work and apparently got a good return from its investment and is pleased with the result. The development of health work in the city has in a large measure been due to the efforts of Mr. H. O. Jenkins who resigned in January, 1914, after three years of most efficient service. His place has been filled by Mr. H. F. Gray of the University of California.

The condition of health in the city is shown by the death-rate of 5.8 per thousand population; 84 per cent. of the deaths being of persons over forty years old and the infant mortality rate being only 41.7. It is pointed out, however, that the birth-rate (9.1) is low owing to many of the city births occurring in a hospital beyond the city limits and a similar factor may influence the death-rate although no mention is made of it.

The state law allowing children to avoid vaccination on the "conscientious objection" ground is said to have failed utterly; the per cent. of certificates of conscientious objection increasing in the past three years as follows: 20.4, 27.2, 37.4, while in one of the schools the "conscientious objections" include 58.4 per cent. of the children, a manifestly dangerous condition. The muzzling ordinance has been satisfactorily enforced and there have been no cases of rabies in either men or animals. An effort is being made to have cases of venereal disease reported (by office number only) and is meeting with some success. It is worthy of note that in three months of the year 1913–14 no cases of any contagious disease were reported.

The condition of the milk supply is especially praiseworthy. The standards have been gradually raised until now no milk may be sold from a dairy scoring less than 65, the minimum butter fat allowed is 3.4 per

cent. in market milk and 3.8 per cent. in inspected milk, the bacteria count on inspected milk may not be over 20,000 per cc., and with the exception of a single dairy the average bacterial count of the various producers did not exceed 50,000 per cc. Milk from cows not tuberculin-tested and passed must be pasteurized and the plentiful supply of good raw milk has driven pasteurized milk from the market.

Other activities of the year have been the making of a complete sanitary survey of the city with a record and permanent index of conditions; the routine work of diagnosis; bacteriological, chemical and sediment tests on milk; and sanitary and dairy inspection.

DEPARTMENT NOTES.

County Health Organization.

A number of states, including Kentucky, Maryland, Georgia, and Kansas, have, according to Dr. Louis I. Dublin of the Metropolitan Life Insurance Company, either passed laws for county health service or are actively engaged in studying the question. Dr. Dublin's paper published in the *Journal* of the American Medical Association for November 14 reviews the need of effective administration for rural districts and advocates the development of efficient county health organizations as the solution of the problem. It is shown that in the twelve years from 1900 to 1912 the death-rate in the registration states decreased 21.2 per cent. in the cities but only 8.6 per cent. in the rural districts, yet it is in those districts that more than one-half of the people of the United States live. A questionnaire was sent to the executive health officers of all the states, from the replies to which it is concluded "that full-time county health officers are an absolute necessity in most of our states; that very few such officers exist; that they are insufficiently paid; that responsibility to the centralized authority is lacking, and that county health work is only too often intimately connected with local politics. The present system of county health administration in the United States is inefficient and not conducive to the public welfare."

The principal requirements of an efficient county system are set forth as: (1) county organization to be an integral part of state health administrative system and responsible to it; (2) county health officers to be full-time, properly qualified and adequately paid officials; (3) tenure of office to be continuous with efficient service.

This paper is of importance in connection with the widespread interest now being taken in the problem of securing effective administration in the great class of the smaller communities and the rural districts throughout the states, the solution of which is to be looked for in plans of state district organization such as that put in operation not many months ago in New York State.

Medical Treatment of School Children in Rural Districts.

Two problems in the medical inspection of school children in rural districts are discussed by Dr. A. E. Williams in the October number of the *Journal of State Medicine*. One of these is the difficulty of visiting and follow-up work in isolated country schools; the other, and greater, is that of insuring the remedying of defects. "The parents, on the whole, are anxious and willing to do everything possible towards obtaining treatment for their children, but, owing to lack of facilities in the way of hospitals, etc., in the majority of cases they are able to do little or nothing."

"The chief aim of medical inspection should be the remedying of the defects found in the children and, if owing to financial reasons or want of facilities the parents are unable to secure the necessary treatment, it is then the duty of the education authority to make provision whereby the children may receive the attention required.

"The only satisfactory method of accomplishing this in rural districts is to provide a clinic on the lines of a 'Flying Clinic,' thus bringing the means of remedying the defects within the reach of all. Much has already been done in this direction, several authorities having established clinics of this de-

scription for the treatment of defective vision, ringworm, dental caries, etc.

"The experience gained up to the present is entirely in favor of the establishment of clinics, and it is now proved that 'flying' clinics are both practicable and useful. The cost is not great, and if the parents are able to contribute a small sum for the treatment received, very little of the expense need be borne by the authorities. The time is not far distant when these institutions will be looked upon as an essential part of every scheme of medical inspection."

A portable apparatus for an eye clinic in use in the author's district is outlined, and a brief account given of arrangements with visiting nurse associations for the treatment of ringworm, verminous conditions, etc. A 'flying' dental clinic is also mentioned.

New York Health Officers Confer.

The recent conference of the health officers of New York State is commented upon as follows by the State Charities Aid Association, which, it will be remembered, had a large part in the investigation which preceded the introduction of the new health law and in the campaign for its passage, and assisted in the work for the re-organization of the state health system:

"The annual conference of health officers, held in Saratoga, September 15 to 18, was the most enthusiastic and significant conference of sanitary officers ever held in this state. It was the first gathering of local officers since Dr. Hermann M. Biggs accepted the Commissionership and began the reorganization of the Department under the new public health law. There were registered seven hundred and fifty health officers, registrars of vital statistics, and members of boards of health.

"Governor Glynn's record in the building up of an efficient and non-partisan health department, under his administration, and his record on health legislation (except his veto of the rural hygiene bill) are highly commendable and form one of the greatest assets in his present campaign.

"The conference developed an enthusiasm for public health work that is a new thing in this state. This is largely due to the high standard that Commissioner Biggs has maintained in all of his appointments. *Esprit de corps* is new in state health activity, but it was distinctly manifest at Saratoga, not only among the staff of the Department, but also among the local officers. Every one felt that a State Health Service is being built in which there is large opportunity for men and women who wish to devote themselves to public health work; a service in which one may be rewarded by successive promotions from the humblest place in the field to executive positions of large responsibility.

"The appointments in the Department have been made with fitness and ability the only factors considered; health work in this state is at last on a scientific basis."

Public Health Administration in Minnesota.

The report of the study of the State Board of Health of Minnesota by Carroll Fox, Surgeon, U. S. P. H. S. appears in the *Public Health Reports*, issue of October 2. It is an exceedingly complete and comprehensive report, worthy of careful study by those interested in public health administration.

Dr. Fox makes no less than twenty-four specific recommendations to the Board of which we quote a few as follows:

"The State is to be divided into twenty health districts each to be under the direct supervision of a physician trained in sanitary science. He is to hold his office during efficiency and good behavior and will be prohibited from engaging in any private business that would interfere with his official duties. He must prove himself capable of filling the position by examination or otherwise before appointment.

"That the number of employees in the division of sanitation be increased by at least five men, four of whom shall have received training in sanitary engineering and one of whom shall be an expert in analyses of water and sewage.

"That the state be divided into four districts in each of which shall be placed one of the men above mentioned as having received training in sanitary engineering, this field force to come under the supervision of the division of sanitation.

"That a law be enacted requiring the reporting of all marriages and divorces to the State Department of Health.

"That the prevention of occupational diseases and the maintenance of sanitation in places employing labor be placed under the control of the State Department of Health, and that legislation be enacted to give it all necessary power to act.

"That the work relative to school hygiene and child welfare, previously discontinued by the state on account of lack of funds, be resumed.

"That provision be made for the distribution of free antitoxin throughout the state where necessary.

"That a popular bulletin be issued monthly, and especially used for instructing children of the public schools.

"That all of the officials of the State Department of Health be made full-time men.

"That the method of keeping accounts be so changed that it will enable one to determine quickly and accurately the exact cost of any division or subdivision or piece of work at any time.

"That not less than $270,000 be appropriated to the State Department of Health to be allotted by the State Board as may be necessary for the following purposes:

General	$20,500
Preventable diseases	25,000
Special tuberculosis	17,000
Laboratory (relating to preventable disease)	28,000
Pasteur Institute	10,000
Free antitoxin	10,000
Vital statistics	10,000
Child welfare and school hygiene	10,000
Control of water and sewage	30,000
Industrial hygiene	10,000
District health organization	100,000
	$270,500

An Experiment in Local Health Administration.

The *Bulletin* of the Department of Health of New York City for October 10, contains a note on an experiment in local health administration. The plan calls for the establishment of a health district within which all the functions of the health department are to be locally directed instead of from the Department headquarters, and in the control of field workers by a local director in place of the various bureau chiefs.

Headquarters will be provided large enough to include a milk station, and "social welfare" or district nurses.

Dr. Goldwater requests,

"Bureau Chiefs to keep in mind the general purpose of the proposed experiment, which is to try out the plan of local health administration: this plan aims at the avoidance of overlapping by different bureaus or departments concerned with health matters, and at increased usefulness through the establishment of intimate neighborly relations between the Department of Health and the local community. The plan outlined is tentative, and is subject to modification.

"The Department does not commit itself to the wider adoption of the plan, but wishes to study it in actual operation. The experiment will involve no extra expense to the city."

Boy Scouts Making a Survey of City.

A unique scheme of coöperation is being tried, apparently with success, in the city of Tacoma, according to the *Municipal Bulletin* of that city. The Boy Scouts are in charge of the work.

"Through an arrangement made by Health Officer Wall with Scout Commissioner F. J. Soule, practically every home in the city will be visited during the next few weeks and a report made to the city on the sanitary condition of the alley, the street, back and front yards and a host of other things.

"If conditions are reported bad by the scouts a regular sanitary inspector will look over the premises.

"Admittance need not be given the Scouts if the householders do not care for the inspection but all houses which refuse to admit the boys will be visited at once by a regular inspector. The city will go on the theory that only those places which have unsanitary conditions to cover up will refuse the Scouts admittance.

"A permanent record of the Scouts' reports will be kept. The city has furnished bound

books, one for each precinct in the city and one page for each house. On this page the Scout will be asked to report on the following: Name, address, condition of street; condition of alley, condition of front yard, condition of back yard, sewer connections, condition of cess-pool, if any, condition of outhouses, if any, water supply, condition of garbage cans, what domestic animals, number of tubercular cases, if any, injuries, if any, on last Fourth of July.

"The last bit of information asked for will give the first complete information about what havoc was wrought by fireworks on the nation's birthday. The rest of the information desired will give the health department an accurate working knowledge of the city's actual condition from a sanitary point of view. The places where sanitary precautions are lacking will be investigated by the regular inspectors. The work of the scouts will save the city many a dollar in labor as the pay-roll men will know exactly where to go to find the conditions that need remedying.

A warfare on the improper garbage receptacles and rubbish is one of the special objects of the survey. Likewise the department wants to know just how many cases of tuberculosis there are in the city. Heretofore, this information has never been had."

Coöperation in Sanitation.

It has been well recognized that through the public schools a great deal may be done in popularizing sanitation and in securing coöperation. Dr. W. H. Marshall in *Michigan Health Bulletin* tells very interestingly his success in securing coöperation in this way.

"Realizing that the public schools were fruitful sources for the dissemination of disease," he says, "I sought, two years ago, to enlist the services of the teachers as sanitarians. At the beginning of the school year, a teachers' meeting is called and the principles of schoolroom hygiene and elementary medical inspection are discussed."

The subjects of ventilation, lighting, and the handling of books are dealt with in detail. Personal cleanliness is emphasized. The detection of eye-strain, adenoids, etc., is described. A brief survey of the communicable diseases is given, particular stress being laid upon immediate action and reporting. Further civic pride is called upon to "clean-up" yards and vacant lots.

The literature of the State Board is freely and liberally circulated with the result that the children have become remarkably well informed on the fly and other pests dangerous to health.

The local lodges, clubs, especially the Women's and Mothers' Clubs, are appealed to with excellent results. The mothers are put on the mailing list of the State Board of Health publication.

Doctor Marshall is enthusiastic about his success in securing coöperation. He is firmly convinced that the coming generation is going to be cleaner and healthier than the present one, as a result of this teaching. The success of a health officer will be in proportion to his success in marshalling the available forces in his community.

Tenement House Law.

According to the weekly bulletin of the Cincinnati Board of Health for August 8, the Metropolitan Life Insurance Company has issued a circular on the tenement house law. This circular is quoted as follows:

Do You Know that the law provides for healthful conditions in tenement houses in Cincinnati? A tenement house is any house occupied by three or more families who live separately and do their own cooking on the premises. The term, therefore, covers apartment houses, which are not called tenement houses in common speech.

Do You Know that the law gives you the following rights?

Right I is that there shall be at least one sink with running water for every two families and not less than one sink on each floor.

Right II is that all common halls and stairways shall be lighted from sunset to 10 p. m. throughout the year. If the halls are dark during the day, windows must be provided or lights kept burning.

Right III is that the owner shall keep all parts of the house in good repair. He must keep all parts used by the tenants

in common clean and free from rubbish, dirt, refuse, etc.

Right IV is that one toilet, a compartment for catch basin or privy vault, shall be furnished for every two families.

Right V is that no cellar of a tenement house not approved by the Board of Health shall be used for living purposes. A cellar is more than one-half below the ground level; a basement, not more than three feet, six inches below. Basements can be used if all rooms are at least seven and one-half feet in height, if they are well lighted and ventilated, and if the floors are well drained and the walls dry.

DO YOU KNOW that the law places certain duties upon you.

First—You must not overcrowd your rooms with members of your family or with lodgers?

Second—You must keep your own rooms clean and free from filth, refuse, etc., and must assist the owner in keeping the entire premises in a sanitary condition.

Third—You must not use any part of a tenement for the storage of feed, hay, rags, excelsior, or any highly inflammable material. The storage of paper stock upon tenement premises is prohibited.

If you are living in a tenement and are not obtaining everything you have a right to under the law, speak to your landlord at once. If unsanitary conditions and nuisances are not abated within a reasonable time, notify the Health Department at the City Hall. Structural defects should be referred to the Building Commissioner.

The law gives you the above rights. See that you get them.

Remember, however, that right and duty are correlative terms.

Sanitary Tax in Asheville, N. C.

The city of Asheville, N. C., has adopted a novel method of taxation to pay for sanitary improvements according to the *Bulletin* of the Health Department for September. Residences and boarding houses are to be assessed as follows:

Assessed Valuation	Annual Assessment
$ 500.00 or less	$ .75
500.00 to $1,000.00	1.00
1,000.00 to 1,500.00	1.25
1,500.00 to 2,000.00	1.50
2,000.00 to 2,500.00	1.75
2,500.00 to 3,000.00	2.00
3,000.00 to 5,000.00	2.50
5,000.00 and over	3.00

Boarding houses of over ten rooms:

10 to 20 rooms	$4.00 annually
20 to 30 rooms	6.00 annually
30 to 40 rooms	8.00 annually

Hotels have been classified in six grades to be taxed from $8.00 to $24.00 annually. All business houses also are to be taxed according to a schedule.

The tax collector is to collect these taxes in the same manner as other taxes.

Hutchinson's All-Summer Fly Crusade.

The September issue of the *Bulletin* of the Kansas State Board of Health contains an interesting account of the All-Summer Fly Crusade. The report is by Doctor Lloyd A. Clay, president of the Hutchinson Board of Health.

The plan is a novel one and it worked very well indeed. Each Monday for the ten weeks between June 29 and August 31 prizes of $2, and $1, each, were awarded the boy or girl who brought the largest and next largest number of flies to the Board office. In addition the merchants were induced to offer prizes from tickets to the "Movies" and soda-water checks, to cameras, watches, etc. Upon the presentation of a hundred flies a child could get a ticket to a moving-picture show. The smaller prizes did much to stimulate and keep up the interest among those capturing only a few flies.

Films and slides were exhibited showing the fly and its filthy habits and telling of its dangerous disease-spreading power. A great deal of literature was distributed and much advertising of the crusade was done. Even the ministers mentioned the subject from the pulpit.

The grand total of 224½ pounds was killed, or more than 37 bushels. This is calculated to amount to 7,172,000 flies during the ten weeks!

"Considering the billions of flies that might easily have descended from these had they been allowed to live, we think the crusade was eminently worth while," says Dr. Clary. We think so too, and congratulate Hutchinson on its novel method of attacking the problem and upon its success.

The Gary Hygiene Bulletin.

A new idea in health bulletins comes from Gary, Indiana, the new city which has introduced so many model plans throughout its organization and especially in its school system. Two copies of the *Hygiene Bulletin* have been received, pamphlets of twelve and sixteen pages respectively which would be a credit to many health departments. The bulletin is published by the Hygiene Department of the Gary Public Schools and it is announced that "the purpose of this Bulletin is to give to the pupils and patrons of the public schools information obtained from the City Board of Health and the Public School's Hygiene Department records, concerning the births, deaths and causes of same, the cases of contagious diseases occurring and other items of interest; also to print reports and papers prepared in any classes, concerning hygiene or sanitation. Where possible these bulletins are used for supplemental study."

The March number of the bulletin is largely devoted to the fly problem and contains articles by students in the public schools on the life-history of the fly, fly traps, methods of controlling flies and on experiments which have been made on fly breeding by the pupils. The articles are well written in an attractive style and are illustrated by original drawings and photographs. In addition there are statistical reports of the Board of Health and its inspectors.

The July number is a milk bulletin and the head of the science department speaks editorially of it as follows:

"This Milk Bulletin was prepared by the eighth grade class in elementary chemistry of the Emerson School, Gary, Indiana.

"The time allowed, including the inspecting trips, was only three weeks, so there was no time for the rewriting of the papers, as the work was done at the end of the school year.

"The work was divided between the boys' and the girls' sections of the class, giving to each those subjects which would appeal to them most.

"Some of the work had to be obtained, necessarily, from literature, but the papers were made original as much as possible. These papers of the *Bulletin* were chosen in some cases because they covered the subject the best, and in other cases because they were the only ones.

"The pupils took a great deal of interest in the *Bulletin* and learned a great many things, which could not have been impressed in any other way."

Main articles are entitled "Breeds of Dairy Cattle," "The Health of the Herd," "Cleanliness of the Herd," "The Proportion of Milk Constituents," "Condition of Containers," "Bacteria in Milk," and "An Inspection Trip to Dairies"; several of them illustrated with good original photographs.

Such a bulletin serves more than one purpose since it not only is a good department bulletin published with minimum trouble and expense, but also it interests the rising generation in public health matters and through them their parents who will read the work of the school children with more interest than they would the ordinary bulletin.

Anti-Typhoid Inoculation.

In the October number of *Nature* there appears an article touching on the question of anti-typhoid inoculation and its necessity in the present war. It points to the fact that in active service sanitary arrangements are often impossible. When it comes to a choice between polluted water or no water the alternative taken is necessarily polluted water. The reasoning is therefore that protective treatment should be applied to all the armies so as to keep down the typhoid. That the preventive treatment is efficacious is well brought out in statistics from all over the world.

Four instances are cited:

1. *British Army in India.* There were 19,314 soldiers. The case rate among the inoculated was 5.39 per 1000. Among the uninoculated the case rate was 30.4 per 1000.

2. *United States Army.* Compulsory inoculation in 1911 included over 90,000 men. In 1913 there were three cases and no deaths. Inoculation has been compulsory since winter.

4. *Canadian Pacific Railway.* Among 5,500 protected by inoculation there were

two cases, while among 4,500 unprotected there were 220 cases.

The paper concludes by stating that no man has the right to endanger the health of his neighbor by contracting typhoid and thus becoming a carrier, when protective inoculation can so easily prevent it.

Chicago Ventilation Ordinance Upheld.

The bulletin of the Department of Health of Chicago for September 26, 1914, reports the good news that the Department has won its fight upholding the ordinance which demands that theatres provide their patrons with clean wholesome air. After a year's litigation which was backed by a large number of the theatre owners of Chicago every contention of the Department and every provision of the ordinance was sustained by the court.

"Over 2,800 pages of testimony were taken from experts, not only from Chicago but from other states as well All features of the ordinance were thoroughly investigated, the quantity of air required per person; the carbon-dioxide content and the matter of prevention of draft received the closest scrutiny; the methods employed by the Department in taking air samples and laboratory methods in analyzing the same were gone over; in fact, samples were analyzed by the Department's chemist in the presence of the master. These samples were taken in various places. In the master's room and in various other indoor localities, also samples of outside air, which were sealed and analyzed by the chemist without his having any knowledge as to where they were obtained. In short, the entire case from beginning to end was marked by its comprehensiveness and attention to detail.

"The complete vindication of the Department's contention and the upholding of the ordinance, upon which its efforts were based, is a long step forward toward securing the much needed reforms in the moving picture theatres of this city."

The Friedmann Cure.

The board of medical officers of the United States Public Health Service, appointed in March of last year to investigate the Friedmann cure for consumption, has completed its work and submitted its report, which will be published shortly in pamphlet form. In brief, the conclusions of the board are:

"The claim of Dr. F. F. Friedmann to have originated a specific cure for tuberculosis is not established by our investigation.

"The claim of Dr. F. F. Friedmann that the inoculation of persons and animals with his organism is without harmful possibilities is disproved."

Tuberculosis as Cause and Result of Poverty.

In a stimulating paper by Dr. S. Adolphus Knopf, published in the *Journal* of the American Medical Association for November 14, the relationships between poverty and tuberculosis are brought out." "The predisposition to tuberculosis in children," says Dr. Knopf, "which is surely and often inherited, comes from what might be called a physiologic poverty not necessarily always tuberculous. Later-born children are more liable." Child labor and the housing of the poor are dwelt upon as responsible for a great deal of tuberculosis. Such considerations emphasize the magnitude of poverty as a cause. As a consequence also of the disease, poverty stands out no less conspicuously. Tuberculosis is shown to be always costly and a great economic as well as social and sanitary problem. The conservative estimate of its annual economic cost in the United States, made by Prof. Irving Fisher in 1912, was $1,235,000,000, not including the cost of tuberculosis in childhood. The serious results from the exclusion of the tuberculous from employment are brought out, and the magnitude of the whole problem is set forth.

A paper by Dr. J. N. Hurty in the same issue relates to the close connections between poverty and other diseases, such as typhoid fever, yellow fever, smallpox, the occupational diseases, and venereal disease.

Foot-and-Mouth Disease.

"The disease may affect human beings, especially children, being transmitted by

milk, from diseased cows (experimentally verified) and by butter and cheese made from such milk as well as through wounds and in other ways. While the course usually is favorable, an epidemic described by Siegel had a mortality of 8 per cent. The manifestations are fever, digestive disturbances and vesicular eruption on the lips, the oropharyngeal lining ('aphthous fever') and sometimes on the skin. Where there is danger of contamination of the milk with the foot-and-mouth virus, thorough pasteurization of all milk and milk products is doubly indicated."

Journal of the American Medical Association, November 14, 1914.

Lecture Courses for Health Department Employees.

"The work of the Department of Health is so varied and progress in public health work in recent years has been so rapid, that it is difficult for the various inspectors and nurses employed in the Department of Health to keep informed concerning the activities of the different bureaus. Yet in order to render efficient service both to the Department and to the public at large, it is highly important that they not only possess such information, but in addition be familiar with progress in medical and sanitary science. With this in view, the Bureau of Public Health Education of the New York City Department of Health, has organized a series of lectures constituting, as it were, a school of sanitary science for its employees.

"In conformity with the general purpose of the lectures, bureau lines have been disregarded, and four courses arranged, as follows:

"A. Course for Medical Inspectors and other Physician Employees of the Department.

"B. Course for Lay Inspectors (Food and Sanitary).

"C. Course for Hospital Nurses (Willard Parker, Riverside and Kingston Avenue).

"D. Course for Field Nurses (Infectious Diseases, Child Hygiene)."

Preventable Blindness in the Newborn.

In the *Journal* of the American Medical Association for November 14 a paper by Dr. Richard J. Tivnen summarizes the situation as to preventable blindness from ophthalmia neonatorum. Statistics from a number of sources are presented to show the numbers of cases. The author asserts that if the simple Credé method of silver nitrate prophylaxis were in universal use "it is certain that the proportion of ophthalmia neonatorum cases would be greatly reduced; and if, in conjunction with the method, practical measures might be devised to insure the early recognition and early treatment of the disease, it is not unreasonable to assert that such infections might be almost entirely eradicated."

In conclusion the plan of campaign recommended by the New York Association for the Blind is given approval:

"*Educational.*—Through the preparation, publication and dissemination of printed matter, emanating from the committee or approved by it; through public lectures, addresses and exhibits; and by means of the press, on whose generous assistance the committee greatly relies.

"The object sought is to spread among the general public the knowledge that infant ophthalmia is a dangerous, infectious disease, fatal to sight unless checked at the time of the birth of the child, easily preventable then if simple precautions are taken; to inform parents, more especially, of the dangers which threaten the sight of their children at birth, and the preventive measures which should be taken; and to advocate the universal adoption of such measures.

"*Legislation.*—To promote such legislation as may be needed to accomplish the object in view—the prevention of the unnecessary blindness of infants.

"*Coöperation.*—In furtherance of the same object, the committee seeks and invites coöperation with medical societies, health officers, ophthalmic, maternity and other hospitals in which children are born, dispensaries, city missions, settlements; with schools, institutions and associations for the blind, and with all societies engaged in work for children and for social betterment; with dis-

trict visiting nurses, and with all persons who are already engaged in this work or who desire to help in it."

The Milk Bottle as Educator.

In the publicity campaign it has been suggested by Dr. F. E. Fronczak, Health Commissioner of Buffalo, "that the milk bottle could be made use of; that it could have a mission and carry a message in its daily entrance to the household. It could carry a label or tag furnished the distributor by the department, with brief epigrammatic information how to care for milk, what to do when the baby is sick, the danger from flies and the like. In other words, make the milk bottle an educator as well as a carrier. The message day by day could not but awaken interest and make an impression."

Control of Habit-Forming Drugs.

Through the operation of a city ordinance which has been in effect for nearly two years in Jacksonville, Fla., a considerable amount of information regarding drug habits has been secured, relating to the extent of these habits and the various factors entering into their formation. Aside from the provisions common to most such laws, the ordinance provides that:

"(a) All druggists filling prescriptions for habit-forming drugs shall keep a record of all such prescriptions and that the originals shall be open to inspection by the police and health departments.

"(b) That every physician writing a prescription containing more than a specified amount of opium derivatives or cocaine, shall place thereon the name and address of the individual for whom it is intended and shall send a copy of the prescription to the health department.

"(c) That the health department may, if it be deemed expedient, furnish free to any habitual user, a prescription for the drug employed."

"These three," says Dr. Terry, Health Officer of Jacksonville," are the essential features of the law concerned with the collection of various information. Through this means we have been able to obtain a very accurate census of the users in the city, the drugs employed, and the amounts taken. We have likewise learned which physicians and druggists deal principally in this traffic and, through the last-mentioned provision, I have come into personal touch with about 300 users and have been able to obtain from them information relating to the formation of their habits."

The information is summarized in the course of a paper by Dr. Terry in the October number of the *Journal of the Florida Medical Association*, which concludes with a plea for the coöperation of the medical profession in the suppression of the evil.

PUBLIC HEALTH NOTES.

Vermont's Poison Lesson.

The recent tragedy in Vermont, in which fourteen persons were killed and a number of others blinded by drinking whiskey adulterated with wood alcohol, brings forcibly to mind the fact that legal provisions throughout the country are inadequate to prevent wood alcohol poisoning. The Vermont incident is an example of what happens every little while in other states.

A very recent instance is that of a number of Armenian rug weavers in New York City who were poisoned by drinking anisette, consisting largely of wood alcohol. Three of the men died, and two were blinded. As the groceryman who sold the anisette and the man who manufactured it have no property, it is not possible to secure damages for those who where blinded, nor for the widows of the men who died. These cases may be prosecuted by the District Attorney and small fines imposed, the payment of which would simply enrich the state, but in all probability have little or no effect upon the problem as a whole.

The difficulty goes further back than even the small manufacturer—that is, to the producers of wood alcohol who rectify this poison so highly that it cannot be distinguished from grain alcohol, known to the trade as Cologne spirits. This rectified wood alcohol, possessing all of its original poisonous qualities and closely resembling grain alcohol, is put on the market under various misleading names, among them being Colonial spirits. As Cologne spirits and Colonial spirits look, smell, and taste alike, we cannot wonder that the poisonous alcohol is sometimes used instead of the non-poisonous spirit.

The Vermont druggist claims that he ordered, and thought he was using, Cologne spirits, but that he was actually sold the poisonous Colonial spirits.

During the last session of the New York State Legislature, the Committee for the Prevention of Blindness endeavored to have passed a law designed to prevent wood alcohol poisoning. At the public hearing on this bill, the danger of confusing Cologne and Colonial spirits was emphasized by the president of the State Pharmaceutical Association. He described a case in which a druggist ordered Cologne spirits, or grain alcohol, to use in preparing his tinctures, extracts, etc. In response to his order he received a five-gallon can labelled "Col. spirits." For some reason this druggist analyzed the contents of the can, and found it to be wood alcohol, the "Col. spirits" evidently being used as an abbreviation for both Colonial and Cologne spirts. Since as little as a teaspoonful of wood alcohol has caused blindness, this man's precaution evidently averted just such a tragedy as has occurred in Vermont.

In spite of the abundance of such evidence as this concerning the dangers of allowing wood alcohol to be sold under present conditions, those interested in the manufacture of this product were successful in their efforts to have the Committee's bill defeated.

The New York City Department of Health has recently amended its sanitary code to require all forms of wood alcohol to be labeled "wood naphtha" and to bear a poison label, together with the skull and crossbones. This is the most definite step that has thus far been taken in this country toward preventing wood alcohol poisoning from imbibition. This requirement, however, will be effective only in New York City, and will have no bearing upon poisoning following the inhalation of wood alcohol fumes in the industries.

Throughout the State of New York the combined provisions of the State Liquor, Pharmacy, and Agricultural Laws are at present inadequate to prevent death and blindness from swallowing and inhaling wood alcohol.

When by state law or through rulings made by the state departments, all forms of wood alcohol are labeled poison, as is required by the New York City department of health, and wood alcohol in the industries is replaced

by industrial (denatured) alcohol, we shall cease to hear of these pathetic and wholesale disasters.

First Year's Work of the Anderson Foundation.

In the *Survey* for October 10, Dr. D. B. Armstrong outlines briefly the excellent work which the New York Association for Improving the Condition of the Poor has accomplished during the past year. Mrs. Elizabeth Milbank Anderson provided the Association with funds sufficient for the creation of a Department of Social Welfare.

"The work of the department was divided at the start into four principal fields. There were founded a Bureau of Public Health and Hygiene, a Bureau of Welfare of School Children, a Bureau of Food Supply and a Commission on Ventilation.

"The department believes that investigation and research should precede propaganda and official action, especially in health matters where there is doubt as to the actual values concerned. Consequently, the work of the department and particularly of the Bureau of Public Health and Hygiene has been in large part of a research character. Its investigation, both social and bacteriological, of bathing conditions in and about New York city was preliminary to the recent action of the Department of Health and the Department of Public Works in the restriction and control of river and land pool bathing.

"Most of the time and funds of the Bureau of Public Health and Hygiene, however, have been devoted to a two year's study of the relationship of the house fly to diarrheal disease or summer complaint among infants.

"The Bureau of Welfare of School Children has entered two main fields: the first, that of the medical inspection and treatment of physical defects among the school children. Investigations were carried out in coöperation with the Bureau of Child Hygiene to determine the needs of the school child, the amount of physical defect, particularly of the eyes, teeth, and nose and throat, and the adequacy of present remedial facilities.

"The Bureau of Food Supply established the Food Supply Store, at the present time conducted mainly as a service to the families receiving food through the Family Welfare Department of the association. It contemplates in the near future the opening of the store to the people in the community, so that it may serve not only as a factor of economic importance in general food distribution, not only as a model of sanitary equipment and operation, but also as a center, together with the branches to be established, for popular educational propaganda."

These do not cover all the Department's activities but it may be seen that they are many and are those "that the city, representing society will eventually carry on."

"It is the aim of the Department of Social Welfare to make its methods positive, coöperative and constructive. Its doctrine is that of prevention rather than palliation. The spirit of the department grows out of a genuine belief in the ultimate efficacy of the growing social consciousness as an instrument for the correction, by evolutionary methods, of the social maladjustments of modern times."

Cure for Leprosy.

Supplement 20 to the *Public Health Reports* of October 16, 1914, contains a most encouraging report by Dr. Victor G. Heiser, Director of Health for the Philippine Islands on the Treatment of Leprosy by the Hypodermic Use of a Chaulmoogra Oil Mixture.

All cases of apparent cures by X-Rays and other remedies have invariably returned before the expiration of a year. Being impressed with the apparent success which attended hypodermic treatment with chaulmoogra oil the Service undertook the treatment of twelve cases of different types on February 21, 1912.

The summarized results to date follow:

Cases placed under treatment	12
Cases taking treatment throughout period	9
Cases apparently recovered and microscopically negative	1
Cases in which clinical evidence of leprosy practically disappeared	4

Cases showing only slight evidences of improvement	1
Cases declining to take prescribed treatment	3

There are over twenty persons who have become microscopically negative since they began treatment.

Dr. Heiser concludes,

"The present stage of the development of the treatment herein described does not warrant a claim that anything like a specific for leprosy has been found, but experience does show that it gives more consistently favorable results than any other that has come to our attention, and it holds out the hope that further improvement may be brought about. It produces apparent cures in some cases, causes great improvement in many others, and arrests the progress of the disease in almost every instance."

Tetanus Spores in Vaccines.

Bulletin No. 95 of the United States Hygienic Laboratory gives the results of a prolonged study of the effects of tetanus spores in vaccines.

Not one of thousands of samples of vaccines examined during a period of twelve years has been found to contain the tetanus bacillus.

A vaccination sore seems to favor ejection of foreign matter, tetanus spores and Bacillus Welchii rather than the absorption of same. Eight rhesus monkeys vaccinated in five places with vaccine virus heavily contaminated with tetanus spores all developed good "takes" but none contracted tetanus. One remained well after tetanus spores were rubbed thoroughly into his "take."

Children in Tuberculous Families.

An investigation into the effects on children of living with tuberculous parents recently completed by the United Hebrew Charities of New York City, shows that 30 per cent. of such children are affected with open tuberculosis in one form or other. The investigation was conducted by Dr. Maurice Fishberg, and covered a period of seven months. The children were examined in the spring and fall and were also reëxamined at intervals in the summer. The homes of each of the children were visited and studied.

"In this manner," says the report, "217 tuberculous families were carefully inquired into. Of these, 136 live in the lower East Side and 81 in the Bronx. The conditions ascertained are worthy of recording, not only because this is the first examination of the kind that has been made in this country, but also because it throws much light upon tuberculosis in general.

"These 217 families live in 717 rooms, averaging 3.3 rooms per household. These 217 families comprised 1,129 persons. That these people were not excessively overcrowded is evident from the fact that there were 1.57 persons per room. Another way of showing the mode of life of these people is by mentioning that there were only 658 beds, couches, cribs, etc., showing that the average was .58 per person. In other words, roughly speaking, there were two persons to a bed. An inquiry was also made as to the number of consumptives who have a separate room to themselves, and it was found that out of 274 consumptives only 112 had a separate room. It is also noteworthy that only 136 sleep in a bed to themselves; the rest, consisting of 138, have one or more persons sleeping with them in the same bed; some were found sleeping on chairs, on the floor in the kitchen, etc."

As a result of this investigation it was discovered that "out of 692 children, one or both of whose parents were tubercular, 56 were suffering actively from the disease; 145 showed signs and symptoms, which place them in the category as suspects, the majority of whom will undoubtedly become consumptives in the near future unless strong measures are taken to give them proper care."

Health Education Bureau.

The Physical Director's Society of the Y. M. C. A. has decided to establish a Health Education Bureau, according to the October issue of *Physical Training*. The Society makes the following suggestions:

1. The establishment of a Bureau.

2. The creation in *Physical Training* of a Health News Section, through which physical directors will be kept informed of current

literature on health and modern methods in health education.

3. The issuance of bibliographies on the subject of health and allied subjects.

4. The creation and publication in large quantities of special leaflets or pamphlets on health subjects which can be supplied to Associations at reasonable rates and distributed by them liberally.

5. The compilation of a handbook on health.

6. The larger development of special lectures, stereopticon slides and films, loaned to Associations at small cost.

7. The arrangement and promotion of exhibits. (a) Illustrative of Y. M. C. A. work; (b) Special arrangements with other organizations, such as:

1. Scientific Temperance Federation.
2. Oral Hygiene Society.
3. Child Welfare Society.
4. Social Hygiene Societies.
5. Tuberculosis Societies.
6. Playground Association.
7. Boy Scout Movement.
8. Safety First Organizations.
9. First Aid and Life Saving Societies.
10. School Hygiene Association.
11. Federal Health Service.
12. The Life Extension Institute.
13. Movements against quacks and quack medicines.

(c) The promotion of health surveys; (d) Preparation of suggested outlines for reading on health subjects.

Public Health Nursing as Prize.

Two prizes, each consisting of two months' services of a public health nurse, were awarded by the State Charities Aid Association of New York to the two granges which sold the largest numbers of Red Cross Christmas Seals during the 1913 campaign. The nurse has just finished her work under the direction of the winning granges, as reported in a recent number of the Association *News*.

"The nurse began her work at each place following well-attended meetings of the Grange at which representatives of the State Grange Public Health Committee, together with representatives of the Tuberculosis Committee of the State Charities Aid Association, congratulated the Grange on its success and emphasized the importance of this experiment in public health nursing in rural districts.

"The work consisted in visiting the sick in their homes, instructing the well members of the families in the care of the patient, assisting the school medical inspectors, investigation as to the kinds and causes of sickness, and the best means of solving the problem of home care in rural communities. As in all public health nursing the nurse worked in coöperation with attending physicians and under their direction.

"The employment of such nurses by town, village and city health officers is authorized by the public health law and the Public Health Committee of the Grange, the State Department of Health, and the State Charities Aid Association hope to make the work of the prize nurse an object lesson in practical public health nursing in rural communities."

Prevention of Mortality in Pregnancy.

In view of the increasing attention now being paid to prenatal instruction and care by visiting or public health nurses, the following remarks from an address by Frederick L. Hoffman, Statistician of the Prudential Insurance Company, before the National Organization for Public Health Nursing last April, are significant as emphasizing the care of the mother in contradistinction to that of the child.

"If we had adequate sickness statistics for this country, the public appeal for an adequate nursing service could be made many times stronger and more convincing than at the present time. It would then be less a matter of sentiment and more a matter of fact. If we could establish statistically the necessity for adequate nursing in necessitous maternity cases, we would not only render an important service to pregnant women, but we would materially aid in reducing the lamentable mortality in pregnancy, which at the present time amounts to over fifteen thousand deaths per annum. This is unquestionably one of the most neglected phases of our modern public health movements. There is a most urgent need for an

intelligent and convincing presentation of the facts. There can be no question of doubt but that by an efficient nursing service, on the one hand, and by an extended use of proper institutional facilities, on the other, a material reduction of the mortality in pregnancy could be brought about within a very short period of time. There is too much reliance upon leaflets and arguments, rules and regulations, and not enough attention is paid to the mechanical factors which determine the death-rate and which are largely within human control."

Labeling for Medical Preparations.

The Department of Agriculture, through the Bureau of Chemistry issued on October 18, 1914, some very pointed suggestions to makers and proprietors of medical preparations, as to their proper labeling in order that they will comply with the Food and Drugs Act as amended.

These suggestions deal with the following:

1. Claims of Therapeutic Effects.
2. Indirect Statements.
3. Indefinite and Sweeping Terms.
4. Testimonials.
5. Refund Guarantee.

Any one interested in this letter may obtain a copy of it from the Office of Information, United States Department of Agriculture, Washington, D. C.

Advantages in Bottling Pasteurized Milk While Still Hot.

The Office of Information of the United States Department of Agriculture has announced that laboratory tests indicate a possibility of using this method to advantage. We quote in full:

"Investigators in the United States Department of Agriculture have found that the process of bottling pasteurized milk while still hot has several advantages which make it seem probable that this method would prove both economical and efficacious when practiced on a commercial scale. In an article printed by permission of the Secretary of Agriculture in the *Journal of Infectious Diseases*, the authors S. H. Ayers and Wm. J. Johnson, Jr., declare that this method results in bacterial reductions as great as, or even greater than, by pasteurization in bottles.

"The principal advantage of the latter method for the ordinary systems in commercial use is the impossibility of the milk becoming contaminated again while being bottled. There is also some saving of milk, because there is no loss from evaporation. On the other hand, when milk is pasteurized in bottles, it is customary to cool the bottles by placing them in cold water. This necessitates the use of absolutely water-tight caps, otherwise some of the cold water is likely to find its way into the milk bottles, and even a very slight leak may result in contamination. Water-proof caps are not only expensive, but care is essential to see that they actually are waterproof, and moreover, bottles with chipped or otherwise damaged tops cannot be used, no matter how nearly perfect the cap may be.

"Laboratory experiments conducted by the investigators indicate that milk may be pasteurized, bottled hot, capped with ordinary cardboard caps, and cooled by a blast of cold air economically and with very satisfactory bacterial reductions. The air-cooling process requires a somewhat longer time than cooling by water, but in the laboratory it was found that thoroughly pasteurized milk, bottled immediately, could be cooled slowly without increasing the bacterial content. Whether or not the experience of the laboratory will be found true in commercial practice, remains to be seen. The Department of Agriculture, it is announced, will conduct experiments with a view to determining this important point.

"Before the milk is poured into them, the bottles should be steamed for two minutes, the authors are careful to point out. This removes all danger of infecting the milk from the bottles, and is another advantage that this new method possesses."

Training of Teachers in Hygiene.

Emphasis is laid upon practical methods in training teachers in hygiene with special reference to their future professional work, by Dr. Carstairs C. Douglas, of Glasgow, in the October *Journal of State Medicine*. The

course conducted by Dr. Douglas for the teachers in training under the Glasgow Provincial Committee consists partly in demonstration lectures and partly in visits to certain schools placed at the disposal of the Committee. These practical visits constitute about one-third of the whole hygiene course. The first visits concern themselves essentially with the school building and the environment of the children. Measurements and observations are made, bearing on lighting, ventilation, cleanliness, etc., and oral questions are carried on. The remaining visits "deal almost exclusively with the child, recognizing that, next to the parent, the teacher in an elementary school has the best chance of observing deviations from the normal in health." The students have the opportunity to observe cases of poor nutrition, mal-development, anæmia, rickets, etc. The recognition of morbid conditions of ordinary occurrence is also dwelt upon. Teachers receiving training of this kind, it is stated, are of great assistance in the medical inspection of school children. It is added, however, that such work can only be carried out where a number of schools and a large number of children are at the disposal of the training institution.

Disposal of Camp Excreta.

An ingenious apparatus for the disposal of excreta in camps, the joint invention of Dr. Myer Coplans and Mr. James Menzies, is to be adopted in one of the English camping areas. It consists of three parts: (1) a partitioned chamber for the reception of excreta; (2) a condenser; and (3) a receptacle for the condensed products. The mixed fæces and urine are poured into a cylindrical tank divided into sections by horizontal partitions through a hopper and broken up by a revolving comb. It passes downward through successive partitions, exposed all the time to very high temperatures, thus undergoing complete disintegration. The solid residue comes out at the bottom, carbonised into charcoal. The volatilised products are then led through the condenser and received in a chamber where they settle out into a heavy ammoniacal liquor, a layer of oil and gaseous products. The gaseous products are piped off to a burner where heat is produced by their combustion to disintegrate the sewage in the partitioned chamber. The ammoniacal layer, the lowest layer of the three, contains pyridine bases which are used as an insecticide against flies, fleas and vermin in general and as a bactericide. The layer of oil is collected and used as a fluid for working the motor which revolves the comb in the cylinder first mentioned. The solid carbonised residue is practically pure carbon which may be used as fuel or for other purposes. "Dr. Coplans and Mr. Menzies," says the Lancet, "have not only been successful in showing how much value lies in excretory products but have also demonstrated that these products may be rendered innocuous and disposed of at a minimum cost or even at no cost at all—the heat required for destructive distillation of excreta being provided by the gas which is set free and the petroleum oil for running the motor also being obtained from the results of the same distillation."

Glazed Petri Dish Covers.

Due to the dissatisfaction caused by the use of the ordinary porous Petri dish top, C. C. Young, director of the Kansas State Water Survey, made some experiments with porous covers glazed on the outer surface which gave much improved results. According to Mr. Young, the glazed cover combines the good features of both the glass and ordinary porous tops. Following are a few of the advantages of the glazed covers:

1. Evaporation of the water from the medium is reduced about 60 per cent. but are still porous enough to absorb all water of condensation.

2. The glass bottoms are not scratched and ground when the plates are stacked in the incubators.

3. The glazed surface affords a convenient place for marking with a wax pencil. The marks can be rubbed off as easily as they can from glass.

4. The glaze adds much strength to the cover; consequently the breakage is reduced to a minimum.

5. They slip one over the other as easily as glass.

6. There is less danger of contamination, as the glaze protects the porous part of the cover so that material spilled on a plate is not absorbed.

Antityphoid Vaccination.

"At this momentous crisis in the history of the Empire, the question of protective inoculation of the troops should occupy a prominent position in the minds of us all. The gravest of all risks in time of war is that from devastating epidemics of infective disease. It is only necessary to recall the ravages of typhoid fever during the South African war; there were more than 57,000 cases of this disease, and of a total of nearly 22,000 deaths from all causes, over 14,000 were due to disease, and of these 8,000 were from typhoid fever. Not only at the front, but at home, there is the danger of an outbreak, as the men collect into camps, or are billeted about the country. Some of them may be typhoid carriers, for about 3 per cent. of all cases of typhoid fever become chronic carriers. The danger with which we are menaced can be obviated by means of antityphoid inoculation, the value of which has been proved beyond question, and the data are indisputable. In the British garrison in India, where about 93 per cent. of the men are now inoculated, the deaths from typhoid fever have been reduced from several hundreds per annum to less than twenty. In the United States army there were last year, among 90,000 men, only three cases of typhoid fever and no deaths. In America and France antityphoid inoculation is compulsory. There is also the danger of dysentery and cholera which cannot be ignored; it has recently been announced that cholera has already appeared in Anatolia. An appeal, signed by very eminent medical men, to which we would add our influence, has recently been issued urging that the time has now come when antityphoid inoculation should at once be made compulsory in our Army."

Journal of State Medicine, October.

Lighting and Ill-Health.

"It is often thought that the excellence of light lies in its intensity and one is apt to overlook the fact that too much light may do as much injury to health as too little. In schools too little light leads to eye-strain and brain-fag, while too much light produces eye and brain irritation, headaches and neurasthenia. Badly arranged lights may lead, in growing people, to bodily distortion and spinal curvature. It is a known fact that the use of spectacles by children is increasing, and in some schools spectacles are supplied and used under medical supervision. It would be very interesting to ascertain what effects would result from an inspection of the illuminating arrangements in schools. In connection with the question of light, Committees of Illuminating Engineering Societies in this country and America are investigating the question of harmful radiations. It has recently been shown that the infra-red rays may be harmful as well as the ultra-violet. Thin plates of marble for screening electric light are now being used: they are about one-eighth to four-fifths of an inch thick and after being polished they are impregnated with oil under pressure at a high temperature. The marble is stated to be so translucent that it will only absorb one-fifth of the light from an electric lamp placed behind it whereas ordinary milk glass cuts off about twice as much. Marble light is practically devoid of the infra-red rays and it has been found that light so produced is very white and agreeable for working conditions."

Journal of State Medicine, October.

Sanitary Sewage Disposal Without Sewers.

The July *Bulletin* of the Indiana State Board of Health contains an excellent description with diagrams and specifications for a small individual sewage disposal system. The system may dispose of the wastes from a house fully equipped with modern plumbing and all the conveniences, or from the old privy and waste pump or sink water, or from the combination of the two.

The plan calls for a non-porous concrete or brick tank sixteen to twenty feet in depth, built on the style of an Imhoff tank. It provides for a chamber for decomposition of sludge as does this tank. It allows the liqui-

fied and settled effluent to run off through four inch porous tile pipe which spreads out fan-like and distributes the effluent through the ground. This tile drain is laid two and one-half to three feet below the surface. A galvanized sludge pipe two inches in diameter permits the cleaning of the digestion vault if necessary.

Sanitary Progress in India and Egypt.

The following article taken from *The American City* for August, 1913, illustrates well the effect of the advance of civilization along health lines in some of the great semi-civilized countries. Where the population is so dense as it is in India, for instance, the problem of preventing the spread of disease is a difficult one. It is to the credit of the English administration in these countries that such good results are being obtained.

"The press of India, both Anglo-Indian and native, is championing a cause which a few years ago would have seemed hopeless in a country where progress is so difficult. To convince a people, with the prejudices of centuries behind them, that sanitation is of the utmost importance to them physically and morally, is no easy task. But in the last thirty years various advancements have been made that make more rapid progress possible now. During this period princes have had their sons educated in foreign countries; high schools have been established by missionaries; and various commissions, considering the needs of the country, have changed the occupations of the people and introduced Western ideas into the larger towns. What has been accomplished along the one line of sanitation, with the intelligent backing of these various agencies, may be inferred from the report of the health of the British troops in India, which is duplicated in the report of the native troops. This report reads that the death-rate of the British troops in the four years 1875-79 was 20.37 per thousand, and in 1911 and 1912 the figures were respectively 4.89 and 4.62 per thousand.

"Remarkable sanitary results have also been attained in Egypt, where the outcome of the British occupation a generation ago was enigmatical. Here the same mental prejudices to cleanliness of body and dwelling had to be overcome as in India, but Lord Kitchener's last report shows how the British irrigation schemes, which have changed the face of that great country, were able, during a shortage of water last year, to prevent the famine and misery which usually follow such a catastrophe. He also comments on the results of the education of the rising generation and prophesies that at no far distant time the plague will be under full control."

Teaching Sex Hygiene.

To ascertain whether the people most vitally interested—namely, the parents and the children—are ready for the systematic teaching of sex hygiene in the public schools, the Bureau of Research of the Upper Peninsula (Michigan) Educational Association recently made an investigation. It asked parents, "Do you believe that sex hygiene should be taught in the schools." To this question 92 out of 317 representative citizens, replied, "yes," and 175, "No."

To ascertain the view-point of the pupil, a series of two lectures were given at a representative school. Some time after the lectures had been given a canvass was made. Of the boys, 85 per cent. thought the system good and wished to continue. About 60 per cent. of the girls were in favor of the lectures.

The *Journal of the American Medical Association* thinks that until the preponderating majority of sentiment favors the idea, the proposition of teaching sex hygiene in the schools should be approached with the "utmost caution."

Twenty-one Cases of Typhoid From One Typhoid Carrier.

The June, 1914, issue of the *Journal of the American Medical Association* reports the case of a farmer who after his supposed recovery from typhoid fever infected his three sons and his wife.

Later those who visited and ate at his house showed a marked tendency to typhoid until the number reached twenty-one. At this point an investigation was carried on and the farmer's urine was found to be in-

habited by typhoid bacilli. The investigation showed that each of the twenty-one cases could be traced with reasonable certainty to this one carrier.

Coöperation of Citizens' Organizations and Health Departments.

Health officials who look askance upon the coöperation of unofficial organizations in the affairs of the health department would do well to consider the results achieved in the Bureau of Health of Philadelphia through the assistance of the bureau of municipal research organized in that city six years ago by a group of public-spirited citizens. The benefits thus attained are summarized in the October number of the *National Municipal Review*. Incidentally the changed attitude of the public official toward such coöperation is emphasized.

"Hitherto, distrustful of political enemies, and possibly conscious of administrative shortcomings which he was powerless to correct, the office-holder resented and, so far as he was able, thwarted any attempt on the part of the citizenship to find out what was going on 'inside.' Even yet, employees who have been long in the service instinctively suppress the most innocuous information and conscientiously believe it to be a duty to enhance the mysterious atmosphere supposed to be necessary in the operation of a public office. That active outside coöperation of a type which presupposes searching investigation should be invited and appreciated is quite as indicative of a new order as that it should be available. It is not a matter of accident, however, that at last the public and the official have 'gotten together.' The rapid evolution of the idea of government as an agency for actively and positively promoting the public welfare has fairly forced this situation upon public and official alike."

The Philadelphia bureau of municipal research made, at considerable expense, expert studies which resulted in marked improvements in the methods of medical inspection of school children. At its suggestion a milk commission was appointed, the findings of which were popularized through the Philadelphia Milk Show of 1911 and were embodied in new milk ordinances. Other advances were the standardization of specifications for the purchase of food supplies for the bureau of charities, the institution of a modern accounting system for public health and charities, and reformed organization in general.

"In a rapidly expanding department, there is always a tendency to add a new division for each added function regardless of its relation to functions already being performed. This growth often results in a straggling ununified organization. This has been very well illustrated in the Philadelphia Bureau of Health. Execution of the housing laws, for example, was vested in three divisions—tenement house inspection, house drainage inspection and nuisance inspection. Laws on the inspection of meat and cattle were enforced by one division, those on milk by another. The disadvantages of such a form of organization are at once apparent. Responsibility is divided, efforts are duplicated, inefficiency results. In order to bring unity and centralization, the departmental organization was studied by the bureau of municipal research. It demonstrated, by means of graphic charts, the illogical sub-division, then existing, and the consolidation necessary for building up a more compact and effective organization." All the changes made by the health officer within the last two years have been in harmony with these suggestions.

Upon his retirement recently, after a tenure of seven years in the office of director of public health and charities, Dr. Joseph S. Neff paid this unofficial organization handsome credit for the part which it had played in increasing the efficiency of the department.

The writer, Dr. N. R. Deardorff of the Philadelphia Bureau of Health, concludes that "although the above sketch by no means exhausts the list of studies made by the new citizen agency for Doctor Neff's department, it serves to show the range of activities and the nature of this new coöperation of official and citizen. For those of us who believe in the efficiency movement in government, Doctor Neff's administration is a most encouraging sign of the ushering in of the new regime. When public officials welcome aid and suggestions and citizens respond to a call so un-

emotional and disinterested, a real and effective democracy no longer seems a dream.

Serum Diagnosis of Syphilis.

According to a recent announcement, the laboratory of the New York State Department of Health has undertaken the serum diagnosis of syphilis by means of the Wassermann reaction, a test now considered essential, not only in the diagnosis of the disease but also as a means of determining the effect and progress of the treatment. When the work is established on a permanent basis physicians will be able to obtain outfits for mailing specimens by filing the name and address of the patient, with the clinical diagnosis.

Saving the Babies.

An interesting comparison of infant death-rates of the City of Dunedin, in New Zealand, and of New York City is given by Dr. C. F. Bolduan in the July number of the *Monthly Bulletin* of the Department of Health of the City of New York. It appears that Dunedin, with a population of 65,000, had an infant death-rate of only 38 per 1,000 births, while New York at the same time had 105 per 1,000 births. In the 12 years ending in 1912, Dunedin brought down its infant death-rate from 80 to 38 per 1,000 births, while in the same period New York's rate came from 165 to 105 deaths per 1,000 births.

From the statistics of 1907 it seems that New York had a 50 per cent. greater death-rate from diarrhoeal, respiratory, and congenital diseases than the New Zealand city. Of course New Zealand enjoys certain advantages over New York which affect these figures to some extent. For instance, its island location, its nearly constant temperature—40° to 68°—and the absence of slums, are certainly advantages over New York.

Aside from these advantages, other factors have also been working. In 1907 the Society for the Health of Women and Children was organized for the purpose of instructing mothers visiting, instructing expectant mothers and young girls, and also maintaining a baby hospital for the care and advice of sick and poorly nourished babies and their mothers. It is claimed that wonderful results are due to running "Baby" columns in the newspapers. By means of these columns expectant mothers may get in touch with the society and become properly instructed.

Somewhat similar work has been done in New York through the Infant Milk Stations. However, the death-rate from congenital diseases has remained practically stationary. Doctor Bolduan concludes that although New York is handicapped by climatic, social, and economic conditions, its infant death-rate is still far too high. If Dunedin can halve its infant death-rate, certainly New York should strive to do the same.

Health is Promoted by Prevention Parade.

October 2 was Disease Prevention Day in Indiana. It was observed widely throughout the state by appropriate exercises and demonstrations. In Indianapolis there was a great and impressive health parade.

The work and coöperation of the many societies, associations, business organizations, public officials and others was nearly perfect. "The good that the demonstration will do as an education of the people in regard to the value of prevention as a foe of disease is regarded as incalculable," says the *Indianapolis News*.

PERSONAL NOTES.

The following persons were elected to membership in the Association, November 9:

Lewis Otto Bernhagen, Minneapolis, Minn.

Seraphin Boucher, M. D., Montreal, Canada.

Arch Cheatham, M. D., Durham, N. C.

Herbert O. Collins, M. D., Minneapolis, Minn.

Charles Oscar Davis, Milwaukee, Wis.

C. St. Clair Drake, M. D., Springfield, Ill.

Ernest Drinkwater, M. D., St. Lambert, Quebec.

Frank E. French, Madisonville, Cincinnati, Ohio.

James Capers Jones, M. D., St. Andrews Bay, Fla.

Ralph Hoagland, Washington, D. C.

Donald McCaskey, M. D., Witmer, Pa.

Charles M. Mansfield, Washington, D. C.

John A. Moore, M. D., Millerton, N. Y.

Ignatius J. Murphy, Duluth, Minn.

Alvin Roy Peebles, Boulder, Colo.

Amos Clifford Shinkle, Cincinnati, Ohio.

Wm. Percy Van Deusen, Minneapolis, Minn.

Elected November 16.

Frank Garwood Atwood, New Haven, Conn.

Eric William Bacharach, Kansas City, Mo.

Henry Chalmers, Albany, N. Y.

John Wesley Cox, M. D., Grand Forks, N. D.

Albert P. Dossin, Meriden, Conn.

Henry Walcott Farnam, New Haven, Conn.

Richard I. Gordon, Tampa, Fla.

Samuel Charles Harrison, Jacksonville, Fla.

Charles Parmenas Henry, M. D., Reading, Pa.

Joseph Howard Beard, M. D., Urbana, Ill.

Henry Granville Hunter, Montreal, Quebec.

William I. Klein, Kansas City, Mo.

Jno. C. Knight, M. D., Plant City, Fla.

Ernest Ellsworth Laubaugh, Boise, Idaho.

Alvin Lucien Light, M. D., Dayton, Ohio.

Benjamin Weil Loeb, Reading, Pa.

Clarence Paulding Rhynus, Washington, D. C.

Minnie A. Seavey, Sacramento, Cal.

Frederick G. Simmons, Milwaukee, Wis.

Herbert Hamilton Wagenhals, Toledo, Ohio.

William Buchanan Wherry, Cincinnati, Ohio.

Jesse Lee Williams, M. D., Jacksonville, Fla.

Joseph Charles Winslow, Urbana, Ill.

Elected November 20.

Charles William Bartlett, Tampa, Fla.

Errol V. Brumbaugh, M. D., Milwaukee, Wis.

Elbridge R. Conant, Chatham, Ga.

Thomas J. Claffy, Chicago, Ill.

Hugh Farris Dickson, M. D., Covington, Tenn.

Clarence Hull Dobbs, Jacksonville, Fla.

Francis X. Govers, New York.

George M. Gray, Cambridge, Mass.

John Kurtz Hoskins, Cincinnati, Ohio.

Leon Stanley Lippincott, M. D., Brunswick, Maine.

Marion Hyman Lippman, San Francisco, Cal.

Charles John Steffen, Milwaukee, Wis.

Adam Sgwajkart, M. D., Chicago, Ill.

Oscar Pammenio Thompson, Waterloo, Iowa.

Alexander Hamilton Twombly, New York.

INDUSTRIAL HYGIENE AND SANITATION.

Industrial Accidents in the United States.

In a paper by Dr. F. L. Hoffman, Statistician of the Prudential Insurance Company, on "Industrial Accidents in the United States and Their Relative Frequency in Different Occupations," a reprint of an address delivered before the Detroit Conference of Accident Underwriters at Milwaukee last February, an admirable statistical survey of the situation is given. Fatal industrial accidents are analyzed in some detail for male wage-earners, with specific consideration of eighteen specified groups of employments. In the order of their hazardous character the principal occupations are metal-mining, coal-mining, fisheries, navigation, railroads, electrical industries, navy and marine corps, and the quarry industry. The author concludes:

"The data presented emphasize the practical utility of general statistics on the subject, which require to be improved and enlarged in many important directions. A thorough investigation of the entire subject would make a most useful contribution to knowledge and facilitate materially the rational development of workmen's compensation plans, on the one hand, and the prevention of accidents, on the other. . . . That there has been a lamentable waste of life and limb in this country can not be denied by any one familiar with the facts; that our accident rate in general, and in special occupations in particular, is decidedly higher than in European countries reflects our past indifference to this important subject. Above and beyond the scientific aspects of the accident problems lie the broader humanitarian considerations and the growing national conviction that the first duty of all concerned is to prevent accidents, and that compensation or insurance follows as a secondary consideration. But when this is granted, the business of insurance in this direction is one of the greatest usefulness and an economic factor of decidedly impressive importance. . . . The time is bound to come when this field of usefulness will be made to include, and to an increasing extent, an adequate provision against the pecuniary consequences of sickness. In the furtherance of such plans the statistical foundations of the problem are of special importance, and it is sincerely to be hoped that . . . a substantial improvement will be secured in the official statistics of industrial accidents as well as in the statistical information regarding accidents and their causes published by the insurance companies."

Do Safety Organizations Pay?

The *Bulletin of the American Museum of Safety* for October contains the following, which should do much to convince the skeptics:

"The Whitaker-Glessner Company of Wheeling, West Virginia, have informed the Museum that, during the time accidents were decreased (64.3 per cent in 1912 and 85.6 per cent in 1913 over the record of 1911), the Company suffered no loss of production. On the contrary, the sum total of safety work has resulted in a material increase in production throughout the plant.

"At the Raritan Copper Works, Perth Amboy, N. J., during the year from September, 1913, accidents decreased 22 per cent. As the Company's safety department has been in operation for little more than half of that period, however, the accident record really shows a decrease of 34 per cent. From September, 1913, to February, 1914, the accidents totaled 112; from March to September, 74.

"The Copper Queen Consolidated Mining Company has just issued the first annual report of its safety department. It was difficult to make a comparison of the year's record with those of former periods, as complete accident records had not been kept previous to the organization of the safety department. Nevertheless, the Company has found that fatal accidents have been reduced 55 per cent. and serious accidents about 40 per cent.

"These figures show what can be accomplished by coöperation. To every officer and employee in these organizations, credit is due for the splendid 'Safety' records made by their Companies."

The Use of Animals in Testing for Gas in Mines.

A recent publication, Technical Paper No. 64, of the Bureau of Mines, presents the results of investigations on the Relative Effects of Carbon Monoxide on Small Animals. The conclusions have been summarized as follows:

"In testing for gas in mines small animals may be used repeatedly without danger of their being less susceptible to carbon-monoxide poisoning after many exposures than after the first, if they are allowed to recover between exposures.

"Canaries are less resistant to carbon-monoxide poisoning than mice, chickens, rabbits, guinea pigs, or dogs. It is recommended that canaries be used whenever possible and that at least three of them be carried by an exploration party.

"Men may display distress in the presence of proportions of carbon monoxide as small as 0.10 per cent. whereas small animals in the same atmosphere may show no signs of being affected."

The Fatality Rate in Metal Mines.

"It is gratifying to note that the fatality rate in the metal mines of the United States was lower in 1913 than in 1912," says Albert H. Fay, engineer of the Bureau of Mines, in a technical paper just issued.

"The number of men employed during 1913 was 193,088, as compared with 169,199 for 1912. The fatality rate was therefore 3.54 per 1,000 men employed as against 3.91 per 1,000 for the year 1912 and 4.19 for 1911.

"While the total number of persons killed in the metal mines during 1913 was slightly more than in 1912, there were about 24,000 more men employed, so that the rate is reduced to 3.54 per 1,000 employed during 1913 as compared with 3.91 for 1912. A number of the states show a slight increase, but a majority of the principal mining states show marked decreases as follows:

"The important mining states showing a continuous reduction of fatality rates during 1911, 1912 and 1913 are Idaho, Michigan, Montana, Nevada, New Jersey, South Dakota and Utah, representing in 1913, 38 per cent. of the mining industry. Of the states showing a decreased fatality rate during 1913 as compared with 1912 only, may be mentioned Alaska, Alabama, Colorado, New York, Oklahoma, Tennessee, Wisconsin and Wyoming.

"This gradual reduction is to be accounted for largely by the introduction of safety appliances, better supervision and a more strict enforcement of rules and regulations of the mining companies, and a closer observance of the state laws. Practically all of the larger companies, and many of the smaller ones, have done much in safeguarding their employees. They have inaugurated the 'safety first' movement with the results above mentioned. By first-aid treatment many slight injuries have been cared for, pain relieved, and a cure effected in a short time, so that many of these injuries have been of short duration and kept out of the 'serious injury' or 'fatality' class."

The number of men employed and the number of men killed in and about the metal mines in the United States during 1911, 1912 and 1913 is shown in the following table:

Year.	Metal mines.		
	Number employed.	Number killed.	
		Total.	Per 1,000 employed.
1911	165,979	695	4.19
1912	169,199	661	3.91
1913	193,088	683	3.54
Average for three years	176,089	680	3.86

Telephone Work and Sight.

"According to the Bulletin of the Ohio State Board of Health there are in the United States about 225,000 telephone girls whose average term of service is three years or less.

The working hours are about eight per diem; the average number of calls is about 140 per hour. The operator sits facing a switchboard which is covered with numbers, each of which has a small signal light that flashes on and off as the call is completed. To complete one call means four flashes of light, and as the average number of calls is 140 per hour rising to 225 or more during the rush hours, the operator's eyes are exposed to from 500 to 1,000 flashes of light every hour. This results in fatigue to the eyes, not to mention the physical strain. The symptoms of eye-strain which the girls develop are headache, dulness, indigestion, nerve-strain, insomnia, colds, &c."

Journal of State Medicine, October.

Lead Poisoning in the Smelting and Refining of Lead.

The Department of Labor Statistics, United States Department of Labor, presents in *Bulletin No. 141* (*Industrial Accidents and Hygiene Series No. 4*) a detailed study of conditions which exist in the smelting and refining of lead.

The Bulletin includes a study of twenty plants, having an average daily pay roll of 7,500 men. Statistics collected in 1912 show that there were 1,769 cases of plumbism in 19 plants in the United States. "Considering how little information it was possible to obtain in many of the plants, it does not seem an exaggeration to say that the number of cases found, falls far below the truth, and that the record for the smelting industry in the United States for one year is at least 1,657 (or 1,769) men poisoned among 7,400 employed."

Dangerous processes due to dust are: 1. Unloading the ore. 2. Crushing and screening ores. 3. Refining the metals secured by smelting.

Due to fumes: Roasting and Smelting.

The following remedies are suggested:

1. Construction: The building must be very roomy, light, well ventilated, the walls clean, and the floors smooth and hard.

2. Sanitary Equipment: Proper washing facilities, and compulsory cleanliness.

3. Dust Prevention.

4. Prevention of fumes.

5. Control of workmen.

6. Medical Inspection.

The Bulletin also contains five Appendices which deal with: Regulations, Medical Inspection, and Care, in English, French and German Smelters.

Appendix 1 is of especial interest for it seems to prove that:

1. Lead sulphide is soluble in human gastric juice.

2. The solubility of lead sulphide is less than that of basic lead sulphate or basic lead carbonate, but the sulphide is sufficiently soluble to be dangerous to the health of persons engaged in mining and milling lead sulphide ore, if the mining and milling processes involve the production of dust.

3. The persons engaged in mining and milling lead sulphide ore should therefore be protected in the same way as workers in other dangerous lead industries.

Industrial Accidents. Their Compensation and Prevention.

In the monthly *Bulletin of the American Museum of Safety* for September, 1914, Mr. Carl M. Hansen, Secretary, Department of Accident Prevention, Inspector and Merit Classification Workmen's Compensation Service Bureau of New York, ventures the opinion "that industrial accidents constitute one of the greatest, if not the greatest, waste in the United States."

"The actual number of workmen killed and injured annually in the United States is not definitely known, due to lack of coordination in statistical departments of the various states. The best authorities, however, on data available have estimated our fatalities of from 40,000 to 45,000 annually and our non-fatal accidents as producing an annual loss of 200,000,000 working days. Reviewing these figures and putting them on a cold dollars and cents basis, estimating the value to society of each man killed of $5,000 and $2.00 as an average wage of the non-fatal injured, the economic annual loss sustained to the nation as a whole amounts to approximately $600,000,000—an amount which must in some way or other be charged

to the production cost in the various industries where the accidents occurred. This, however, does not include the indirect loss accruing in the form of restricted opportunities suffered by the dependents left by these killed and crippled wage-earners. What that amounts to it would be impossible to compute with the insufficient data on hand. I make bold to opine, however, that industrial accidents constitute one of the greatest, if not the greatest, waste in the United States."

Twenty-two states in the union have "passed some form of legislation bearing upon the subject of specific compensation for injuries sustained by workers in pursuit of their daily vocations." These laws "differ radically in application but are all founded on the same general principles, namely:

"1. To furnish automatically certain prompt reasonable compensation to injured employees and their dependents.

"2. To utilize for injured employees a large portion of the money wasted in litigation under the old common law liability system.

"3. To provide a tribunal distinct from the courts where disputes between employer and employee in reference to compensation for work accidents may be settled promptly with a minimum of cost to either party.

"4. Last, but by no means the least important, to provide an economic incentive for the reduction of work accidents.

"Different systems of insurance are provided in most of the laws passed, and in all laws operating successfully it is well to note that four distinct systems are provided, as follows:

"1. Self Insurance, where the financial responsibility of the employer warrants it.

"2. Mutual Insurance, under private management.

"3. Mutual Insurance, under supervision of a state official.

"4. Our long-adhered-to system of insurance through private stock companies.

"The premium which an employer pays for insurance, represents the amount to be distributed over his product, afterward to be reflected in the final purchase price at which the goods are sold to the consumer."

In New York the rates for compensation insurance are computed by the Workmen's Compensation Service Bureau. This bureau is composed of the twenty-three leading stock liability insurance companies in the United States and they write from 85 per cent to 95 per cent of all the compensation insurance taken out. The rates are based on the actual statistics and experiences of these companies.

"Any plan of compensation for work accidents to prove effective and to truly fulfil what is expected of it must primarily be prophylactic; that is, it must lay less stress on compensation for, than prevention of, such work accidents. It is well known that only a limited number of industrial accidents can be prevented through mechanical safeguards. The vast majority of accidents are due to inherent recklessness in the individual workmen. The solution lies *in educating the rank and file of employees out of instinctive recklessness into intuitive caution.*

"Engineers, architects, and contractors should be particularly interested in this subject. In any phase of engineering endeavor, standardization is the road to success and that must be true in accident prevention. Uniform standards for safety are essential. The designing engineers of this country must in the future pay as much attention to the subject of safety as they have in the past paid to efficiency of their machines. Architects must as seriously consider and devote as much care to the safety of the occupants in the buildings they are constructing as they have in the past devoted to artistic appearances and conveniences.

The United States has become the greatest industrial and commercial nation on earth, but one of the fundamentals upon which we must build our future is that our industries and working establishments be made reasonably safe for the men and women who are to live in them during working hours. We must make it the duty of every foreman and superintendent not only to deliver the product of the plant to the world's market, but we must equally insist that he deliver the employees under him to their respective homes every evening without having been killed or maimed. We owe that to our wage

earners from a humanitarian standpoint and we owe it to our nation as a whole from an economic standpoint."

The Basis of a Sickness Insurance Bill.

A year and a half ago the American Association for Labor Legislation announced a Committee on Social Insurance. Five months later it organized the first American Conference on Social Insurance, in Chicago, and with the published proceedings presented a convenient classified bibliography for the encouragement of students. At its annual meeting in Washington last December the association devoted half a day to the discussion of carefully prepared papers and reports on sickness insurance, believing it the most urgent of the problems in this field, now that much progress has been made toward compensation for industrial accidents.

Recently, after many conferences for discussion and revision of proposals, the committee has formulated a tentative statement of the essential lines which it purposes to follow in the drafting of a sickness insurance bill. In the hope that this statement may call forth helpful suggestions and be of substantial assistance in formulating legislative plans in the several states in which the subject has begun to receive attention, it is published below:

1. To be effective, sickness insurance should be compulsory, on the basis of joint contribution of employer and employee and the public.

2. The compulsory insurance should include all wage-workers earning less than a given annual sum, where employed with sufficient regularity to make it practicable to compute and collect assessments. Casual and home workers should, as far as practicable, be included within the plan and scope of the compulsory system.

3. There should be a voluntary supplementary system for groups of persons (wage-workers or others) who for practical reasons are kept out of the compulsory system.

4. Sickness insurance should provide for a specified period only, provisionally set at twenty-six weeks (one-half a year), but a system of invalidity insurance should be combined with sickness insurance so that all disability due to disease will be taken care of in one law, although the funds should be separate.

5. Sickness insurance on the compulsory plan should be carried by mutual local funds jointly managed by employers and employees under public supervision. In large cities such locals may be organized by trades with a federated bureau for the medical relief. Establishment funds and existing mutual sick funds may be permitted to carry the insurance where their existence does not injure the local funds, but they must be under strict government supervision.

6. Invalidity insurance should be carried by funds covering a larger geographical area comprising the districts of a number of local sickness insurance funds. The administration of the invalidity fund should be intimately associated with that of the local sickness funds, and on a representative basis.

7. Both sickness and invalidity insurance should include medical service, supplies, necessary nursing and hospital care. Such provision should be thoroughly adequate, but its organization may be left to the local societies under strict governmental control.

8. Cash benefits should be provided by both invalidity and sickness insurance for the insured or his dependents during such disability.

9. It is highly desirable that prevention be emphasized so that the introduction of a compulsory sickness and invalidity insurance system shall lead to a campaign of health conservation similar to the safety movement resulting from workmen's compensation.

The chairman of the Committee on Social Insurance is Edward T. Devine, and secretary John B. Andrews, secretary of the American Association for Labor Legislation.

The Survey, August 8.

Tuberculosis Among Metal Molders in Massachusetts.

In the July issue of the *Journal of the Massachusetts State Sanatoria* there is an instructive article by the editor relating to tuberculosis among iron molders in that state.

"The diseases to which molders are most

liable are rheumatism, pneumonia, kidney inflammations, bronchitis and consumption. In Massachusetts we have many metal-working establishments connected with which are foundries in which different metals are melted and molded. Thus we have iron foundries, brass foundries, composition metals foundries, silver foundries, electrotype foundries, etc.

"The molder's life while at work may truly be said to be one of risk to limb and hazard to health. In it he is exposed to the laborious nature of much of his work, to extreme heat, to gases created by the work, to metallic and mineral dusts, to such metallic poisons as lead, copper, zinc and antimony, to the danger of burns from hot metal, to danger to eyesight and to the danger connected with stepping from a very hot foundry while overheated and tired by the day's work into a cold outside air.

"The iron molder spends his forenoon preparing his molds for the afternoon 'pouring' off. This latter process lasts from an hour to two hours or longer, and is the most strenuous and exhausting part of his work. Stripped to the waist, or else clothed as to his chest with a thin undershirt only, he hurries from the furnace or 'cupola' as it is called, in which the metal is melted and from which it is 'poured,' to the molds, carrying in an awkward position a long-handled iron ladle full of molten iron, the whole weighing about forty pounds. After pouring the metal into the molds he hurries back to the furnace for a fresh supply. The foundry at this time is very hot from the heat of the furnaces and of the metal in the molds. From many of the latter gases escape. The work is done with a rush and at the end of the pouring off the molder is much overheated and frequently is worked out. He hurries then to the wash room, where he strips and bathes under good or bad conditions as the case may be. Then he hurries into his street clothes and starts for home. In cold weather it is this sudden passing from a condition of overheat and profuse perspiration to a temperature from 60 to 90 degrees less than that of the foundry that tests the vitality of the molder and many times results in rheumatism, pneumonia or acute bronchitis which often becomes chronic and to which latter tuberculosis is sometimes secondary.

"The iron molder is also exposed to a considerable amount of dust from the sand used in the molds, and if he is also a polisher, as may be the case in small foundries, he is still further exposed to dust from emery and iron. Gases and smoke escaping from the molds at the time of pouring vitiate the foundry air.

"The iron molder pours once a day. The brass molder pours twice a day, once in the morning and once in the afternoon. The brass molder's work is on the whole not so strenuous as that of the iron molder, but he is exposed to dangerous influences which do not appear in iron molding. I mean the inhalation of fumes of molten copper, zinc and other metals. This exposure is most pronounced at the time of 'pouring off' for at this time the melting pots are open, the molten metal is ladled out and poured into the molds and the molders inhale large quantities of the fumes even in foundries in which the ventilation is helped by power fans and blowers. Most brass molders at some time in their working lives have what is known as 'brass founders' ague,' which is a sickness characterized by headache, vomiting and chills and which is the direct result of poisoning by the fumes of melted zinc. The effect of these poisonous fumes in the production of tuberculosis is a secondary effect, that is to say, the fumes themselves do not produce tuberculosis but do so weaken the vitality of the workers that they are rendered easier prey to the disease.

"Electrotype molders are exposed to the fumes of molten lead, antimony and tin, and these men occasionally show signs of chronic poisoning by lead or antimony.

"The chief factors then in the molder's life in connection with the development of tuberculosis are the exhausting nature of the work, the overheat and subsequent exposure while exhausted to cold out-door air, the exposure to dust and to gases and, as stated, the exposure of certain molders to the debilitating effects of the fumes of poisonous metals. And to these must be added that factor so common to all exhausting occupations, the abuse of alcohol, which appears to be almost a direct result of the nature of the work."

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Vol. IV. DECEMBER, 1914. GENERAL No. 12.

FEB27 1915

AMERICAN JOURNAL of PUBLIC HEALTH

THE JOURNAL OF THE AMERICAN PUBLIC HEALTH ASSOCIATION

EDITED BY
SELSKAR M. GUNN

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Editorial and Business Office, 755 Boylston Street, Boston, Mass., U. S. A.

PUBLISHED MONTHLY BY
THE AMERICAN PUBLIC HEALTH ASSOCIATION
AT BOSTON, MASS.

Entered as Second Class Matter at the Post Office at Boston, Mass., February 16, 1914, under the Act of March 3, 1879

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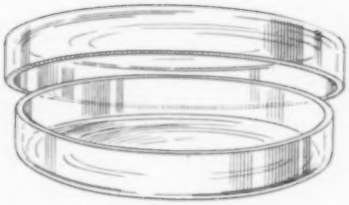

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Second.—Deep incisions must be avoided.
Third.—Glycerinized virus is the best form of vaccine to use.
Fourth.—Careful examination of the vaccination from eight to twelve days after the operation should be made to determine the results, and certificate issued accordingly.
Fifth.—Use only fresh vaccine when compelled to vaccinate in hot weather, and if necessary to store it, keep it in the coldest place obtainable.

Physicians should insist on vaccine being kept at a temperature not above 50° F. Extensive studies in the Mulford Laboratories proved that vaccine kept at this temperature (ordinary refrigerator temperature) may remain active after six months, while vaccine kept at 98° F. is inert and will not "take" after three to four days. With these facts in mind the physician will realize the advisability of vaccinating during cool weather.

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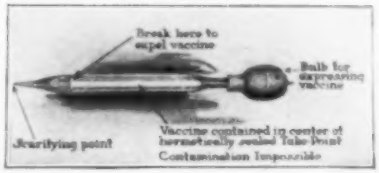
Break here to expel vaccine
Bulb for expressing vaccine
Scarifying point
Vaccine contained in center of hermetically sealed Tube-Point
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The vaccine is hermetically sealed within the tube-point and cannot be contaminated.

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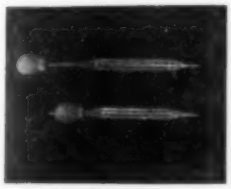

1. Place the rubber bulb over the small end of the tube-point, so that the end of the glass tube protrudes through it.

2. Scarify with the point, drawing no blood.

3. Break the tube inside the bulb.

4. Remove end of capillary tube from bulb.

5. Break off the point at the file mark.

6. Expel the virus from the tube directly on the scarified area by means of the rubber bulb and rub in virus with the end of tube.

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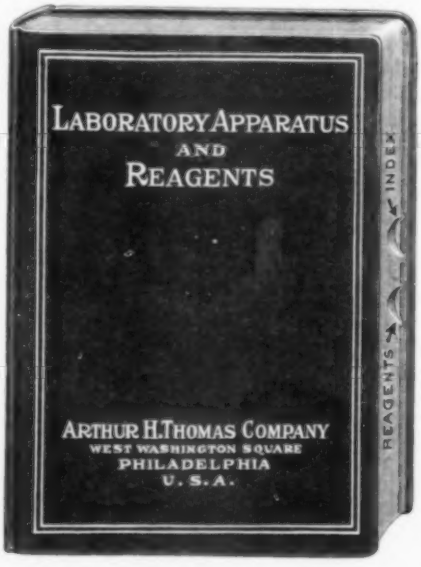

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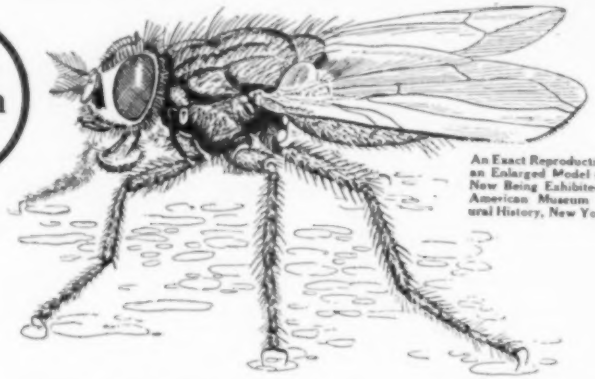

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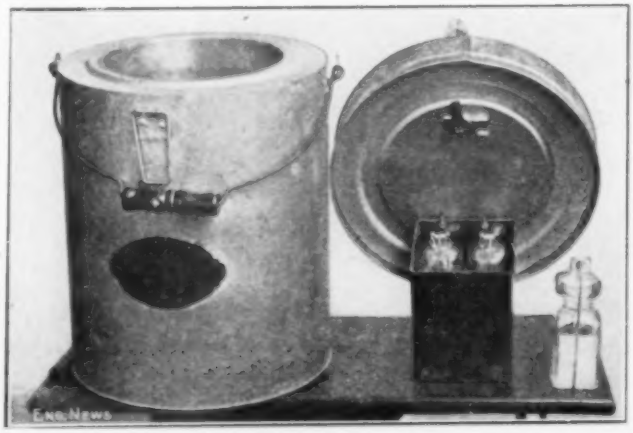

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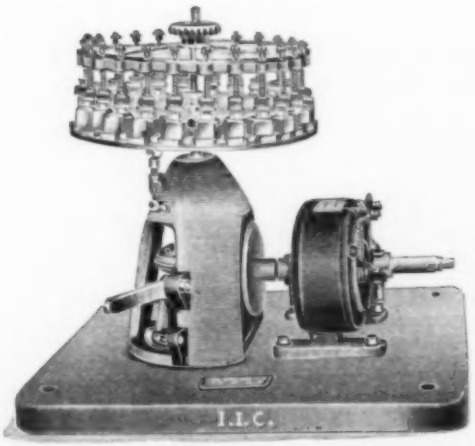

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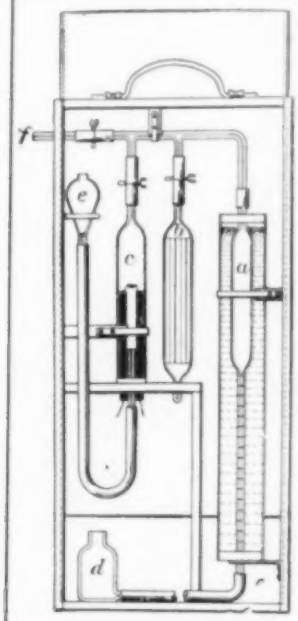

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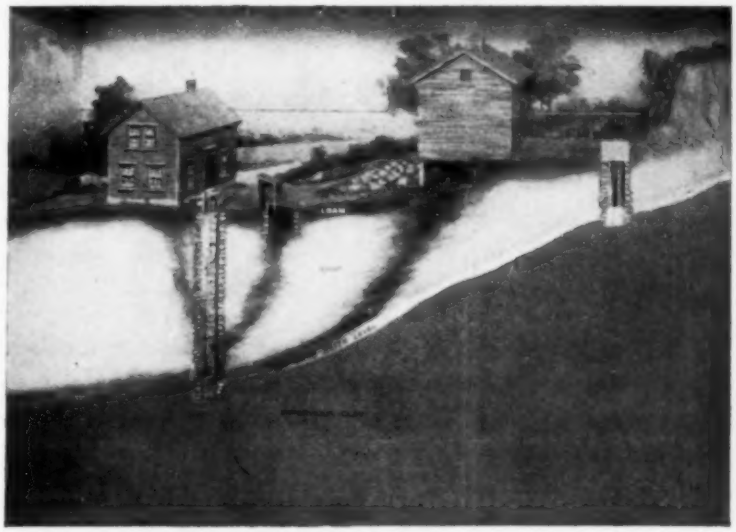

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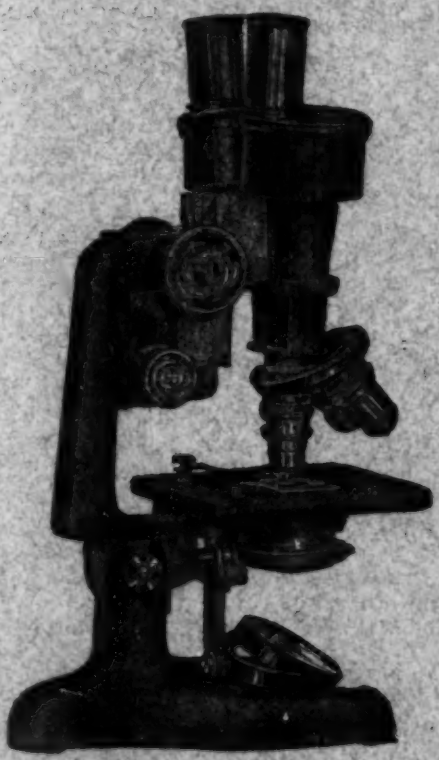

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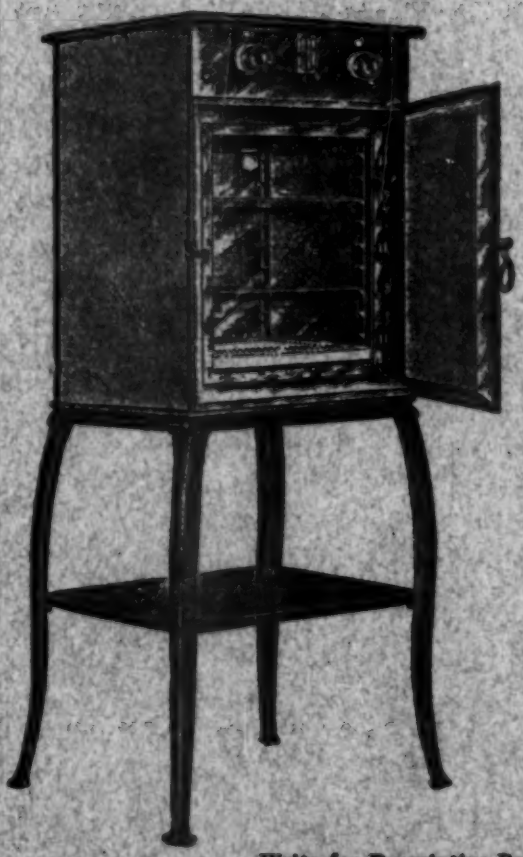

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